Chapter 3 – Project Description

Vares Polymetallic Mine ESIA
Draft V0.3

September 2021

Adriatic Metals

wardell armstrong

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3 PROJECT DESCRIPTION

3.1 Project Overview

3.1.1 Project Overview

This chapter outlines the project description that has been utilised for the purpose of the proceeding impact assessment. The design presented here is in line with that reported in the 2021 Ausenco Definitive Feasibility Study and associated press release[1].

The Vares Project comprises the polymetallic underground Rupice Mine and the Vares Processing Plant with associated infrastructure. The following infrastructure is associated with the Project, with further details provided in the remainder of this chapter:

- Rupice Infrastructure, comprising:
  - underground workings, including ventilation drives and declines, ;
  - Backfill and shotcrete plant;
  - Waste Rock Stockpiles;
  - Three stage crushing plant;
  - Three Run-of-mine (ROM) stock piles of varying grade;
  - Haul truck maintenance workshop;
  - Refuelling station;
  - Water treatment plant for acidified runoff from the stockpiles
- Haul Route: 24.5km long haul route, connecting the Rupice mine to the Vares Processing Plant.
- Vares Processing Plant (VPP) Comprises of:
  - Crushed ore handling;
  - Grinding facility;
  - Flotation circuits (silver-lead and zinc);
  - Concentrate thickeners and filters;
  - Tailings thickener and filter;
  - Concentrate loading;
  - Reagents handling and storage areas;
  - Tailings Storage Facility: Located in the valley directly south of VPP.
- Rail load out facility: Droskovac in Vareš, a previously operational facility that is being restored for the project.

3.1.2 Current Project Status

Following the completion of a mining scoping study in Q4 2019 led by CSA consultants, and a Pre-feasibility study (PFS) led by Ausenco Engineering Canada (Ausenco) in Q4 2020, a Definitive Feasibility Study (DFS) has now been completed for the Vares Project, also led by Ausenco, in August 2021.

[1] https://www.investi.com.au/api/announcements/adt/25968aa7-0cd.pdf

The JORC compliant Mineral Resource Estimate for Rupice was updated in August 2020 by CSA Global in Perth and comprises of 12.0 Mt Indicated and Inferred Resources at 149 g/t Ag, 1.4g/t Au, 4.1% Zn and 2.6% Pb, as set out in Table 3.1.

Table 3.1: Vares Project MRE Classification

JORC Classification	Ts (Mt)	Grades					Contained Metal						
		Zn (%)	Pb (%)	$BaSO_4$ (%)	Au (g/t)	Ag (g/t)	Zn (kt)	Pb (kt)	$BaSO_4$ (kt)	Au (koz)	Ag (Moz)	Cu (kt)	Sb (kt)
Rupice													
Indicated	9.5	4.9	3.1	29	1.6	176	465	294	2,730	500	54	52.1	21
Inferred	2.5	0.9	0.7	9	0.3	49	23	18	218	27	4	4.1	3
Total	12.0	4.1	2.6	25	1.4	149	488	312	2,948	526	58	56.1	24

3.1.3 Scale and Life of Development

Construction will be initiate once the Project is fully permitted (see Chapter 2). It is anticipated that initial breaking ground for early works will be in September 2021, though full construction will not begin until Q1 2022. The haul route construction will be undertaken by JKP Vares, whilst the TSF preparation, VPP construction and Rupice Infrastructure development will be managed by Adriatic Metals and undertaken by contractors. This will occur throughout the first half of 2022.

Early works to be undertaken during 2021 include the felling of trees along the haul route and at Rupice, as well as the development of access roads to Rupice and the mine declines. The majority of construction work will commence in Q1 2022.

In total 7.3Mt of ore will be mined and 1.8Mt of waste over the 14-year Life-of-Mine (LoM) for the Vares Project. The pre-production phase is due to begin in September 2021 and will continue until June 2022 when first ore production is scheduled. Peak ore production is anticipated in year 6 (2026).

Table 3.2 Mining Schedule (tonnes)

Year	1	2	3	4	5	6	7
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Waste	26,951	365,821	291,742	313,578	334,354	143,022	18,617
Total Ore	-	283,013	834,323	855,036	898,556	947,312	921,676
	8	**9**	**10**	**11**	**12**	**13**	**14**
Year	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Waste	17,946	167,756	6,210	11,756	10,910	2,931	-
Total Ore	818,160	805,242	397,510	245,226	232,513	55,693	-

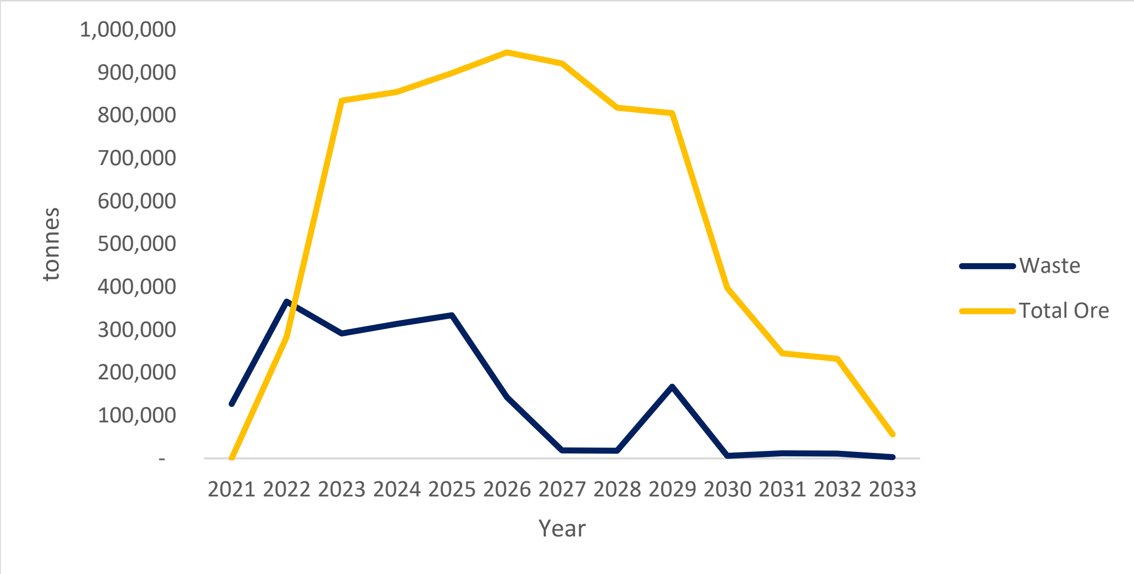


Figure 3.1: Mine Development Schedule

3.1.4 Project Layout

The Project layout, as presented in the 2021 Ausenco DFS, comprises of three main components. The Rupice site, haul route and the Vares Processing Plant, Drawing 3.1.

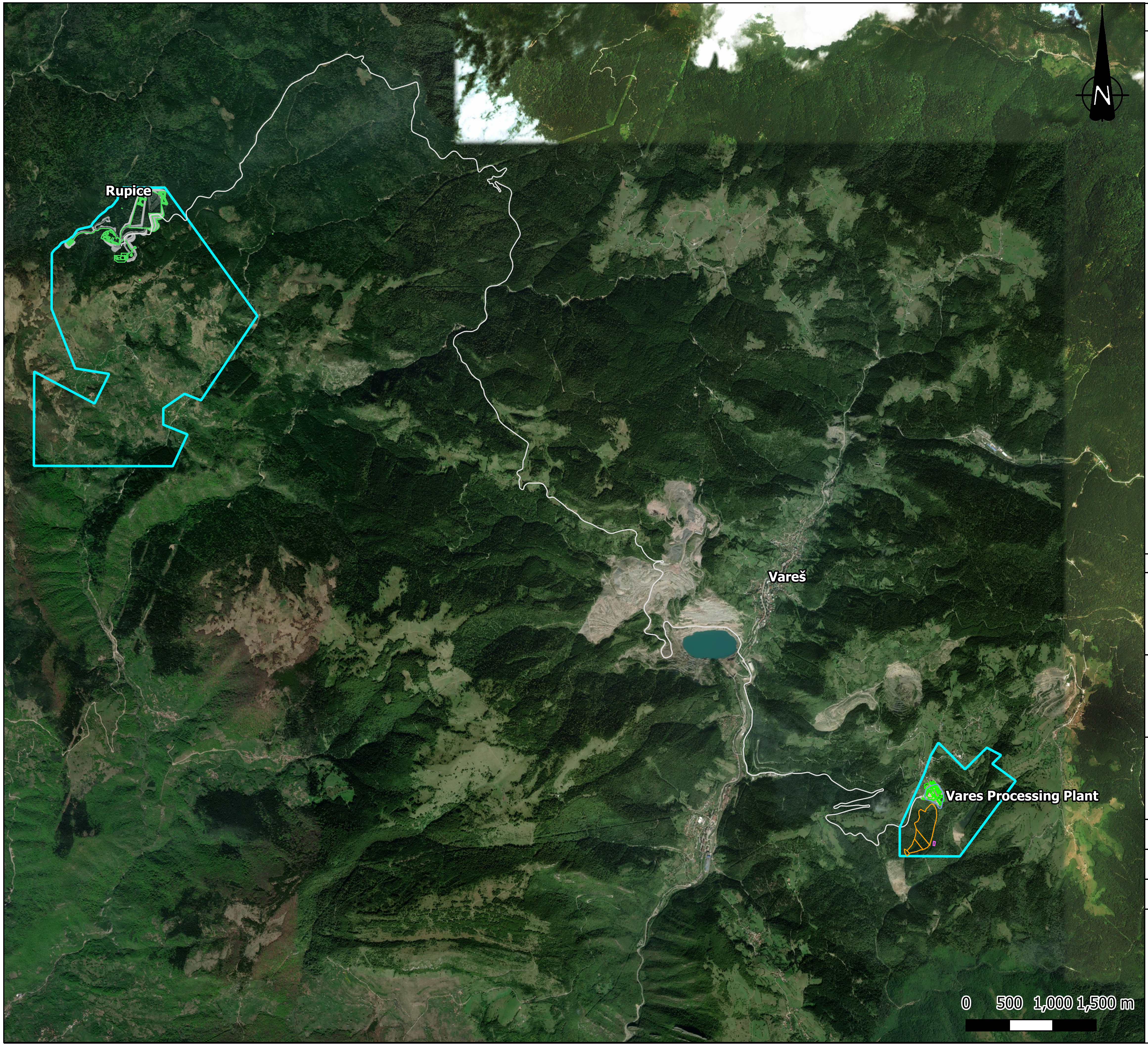
The Rupice site consists of several terraces accommodating the portal access to the two production declines and one ventilation Return Airway decline, the stockpiles required for management of ore and waste rock, and the three-stage crushing and screening plant. The paste backfill plant and the associated stockpiles and ancillary facilities are located on their own terraces near the upper underground portal at the site.

The haul route traverses eastwards from Rupice to connect the mine site to the VPP at Tisovci. At the plant site existing buildings and concrete structures have been demolished as necessary to accommodate the revised site layout. Notably, the historic tailings thickener is to be re-used as the process water tank in the design. The tailings storage facility is proximal and southwest of the process plant.

The overall footprint of the Project is 54.5ha, of which 4.5ha is brownfield land and approximately 9ha is existing road. Land take by section is shown in Table 3.3.

Table 3.3: Land Take

Project Component	**Land take**
Rupice Infrastructure	11ha
Haul Route	28ha
Vares Processing Plant	4.5ha
Tailings Storage Facility	11ha
TOTAL	**54.5ha**



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Key

- TSF
- Infrastructure
- Haul Road
- Concession Boundary

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT
Adriatic Metals PLC

PROJECT
Vares Project ESIA

DRAWING TITLE
Site Layout

DRG No. ZT520182/3.1		REV A
DRG SIZE A3	SCALE 1:60000	DATE August 2021
DRAWN MBW	CHECKED BY AM	APPROVED BY AA

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3.1.5 Associated Facilities

Several aspects of the Project have been identified and treated as associated facilities, in accordance with EBRD performance requirements. These include:

- Water supply and pipeline for Rupice, located on the Bukovica River which is to be developed and managed by Vares Municipality;
- Railway head, an existing building that will be developed and maintained by the FBiH government;
- Railway, the existing railway is in need of recommissioning, this will be re-established and used by the Project for transport of ore to the port of Ploce, Croatia; and
- Underground transmission line to Rupice, to follow along the haul route and to be maintained by the electricity supply company Elektropriveda d.o.o.

3.2 Site Overview

3.2.1 Location and Access

The Project is located in the Vareš municipality of the Zenica-Doboj Canton, BiH. The Rupice and Vares Processing Plant sites are located approximately 8.7km west-north-west and 3.5km east, as the crow flies, respectively from the town of Vareš (the administrative centre for the municipality centre and largest town in the region). The closest commercial airport is in Sarajevo and the exploration concession can be reached from the capital city via 50km of sealed roads and the coal mining town of Breza.

The project sits within mountainous (up to 1250m*)* terrain with widespread forests and grasslands. Rural communities are dispersed within the surrounding area with a combination of paved and unpaved roads available. Site access will be via a purpose-built road, comprised of paved and unpaved sections. At present site access to Rupice is compromised by snow fall and icy conditions during winter months, meaning clearance and maintenance will be required.

A rail link exists from Vareš, connecting it to the port of Ploče in Croatia. Plans developed by the government of FBiH exist to extend the rail line north, beyond Vareš where it currently terminates, and connect it into the main Balkan network.

Current access to the Rupice site from Sarajevo consists of travelling north on the R444 and then turning west onto the R444a, north of Vareš, toward the site. From the R444a, a secondary sealed road (bi-directional single lane) accesses the village of Borovica Gornja and ultimately the Rupice exploration concession via an unsealed exploration track in reasonable repair. The Rupice Underground Mine, situated in the Rupice concession, will be connected to the Vares Processing Plant via 24.5km of sealed and unsealed roads that by-pass the town of Vareš.

3.2.2 Site Setting

The Dinaric Alps are found running through western BiH parallel with the Adriatic coast, with a maximum peak elevation of 2,694m. The Project area is a mountainous region interspersed with river-cut valleys. The area is characterised by undulating terrain and steep valley and mountain slopes, see Table 3.4.

Table 3.4: Geographical Data Values for the Project

Item Description	Unit	Detail
Country	-	Bosnia and Herzegovina
Region	-	Zenica-Doboj Canton, Vareš Municipality.
Area	-	Zvijezda Mountain and Vrući Potok valley
Design Altitude AMSL	m	1060-1250
General topography of site	-	Mountainous
Survey co-ordinate system	-	MGI1901 / Gauss Kruger Balkans Zone 6 – EPSG:3908
World co-ordinates (longitude, latitude)	°	Rupice: 44°11'49"N 18°13'53"E VPP: 44° 8'25"N 18°20'59"E Rail: 44° 8'31"N 18°19'20"E
Seismic Peak Ground Acceleration	ms^{-2}	500 year return period: 0.128g 10,000 year return period: 0.216g

The landscape around Vareš is an alpine community and is predominantly dense forested lands however, there are areas of agriculture and pastoral pockets.

Photo 3.1: Communities and Mountainous Forested Lands.

The climate across BiH is temperate continental in the lowlands with an alpine climate in the mountainous regions, as with the Project area. A Mediterranean climate is experienced along the coastal areas along the south and south-eastern part of the country.

Vareš has a humid climate with an average temperature range of 17.5°C in July to -3°C in January. As the altitude increases, air temperature drops by approximately 0.6°C per 100m. For a full description of the climatic setting of the Project, refer to Chapter 4.2 Climate Baseline.

3.2.3 Hydrology

The hydrological network is well developed with mountainous catchments and numerous streams feeding into larger rivers. The watercourses are sensitive to rainfall events due to their mountainous nature and respond with short, flashy increases in flow. The closest watercourses to the Project sites form part of the Bosna River network and are the Mala River, Borovički stream and the Vrući stream.

The western arm of the Mala river runs past and downstream of the Vares Processing Plant site and is the largest water course in the Project area. The Mala River has its source upstream of Vares Processing Plant and flows south-west for approximately 3.3km through the concession to its confluence with the larger Mala River. Downstream of concession for a further 6.1km the Mala river flows through a steeply incised wooded valley before reaching a confluence with the Stavnja river

The watercourses within the area of influence of Rupice are the Borovički stream and the Vrući Potok ('Hot stream') which flank the Kiprovac ridge upon which the Rupice site is located. The Bukovica stream is located 5km east of the site and is included in the area of influence as this is the selected raw water supply source for the Rupice operations. The Borovički and Bukovica streams flow for approximately 8km in a south-westerly direction to a confluence of the two which then becomes the larger Bukovica river, which then joins the Trstionica and becomes a tributary of the Bosna River. The Borovički stream flows through the village of Borovica Donja, downstream of Rupice. The Vrući stream is a small mountain stream to the north of the Rupice concession which flows north for 2.5km from its source to its confluence with Trstionica, a tributary of the Bosna River. The Bukovica, at the point of abstraction, is a spring source which has an existing, unused water intake structure owned by JKP Vareš the local water utility.

The public water supply source on the Bukovica river located 8km south of the Rupice site provides municipal water supply for a component of the 37400 inhabitants of Kakanj city. Most of the city's water supply (63 %) is derived from four sources, one of which is the Bukovica, the public water supply is administered by the Zenica-Doboj Canton.

3.2.4 Site History

The area of Vareš has a history of mining. Lead, zinc, and iron have been mined in the area since medieval times. From the 1890s for almost a century iron ore mining occurred in the area of Vareš and Vareš Majdan. Historic mine workings are present throughout and surrounding the Vares Project concession area, consisting of large formerly operated open pit mines and several exploration adits.

From 1983-1987 the Veovaca open pit was operated, located close to the Vares Processing Plant. Over 400ktpa of ore was treated to produce Zn, Pb and Barite concentrates. The onset of the Yugoslav Wars meant that mining within the area came to a halt and production ceased. Exploration in the area came to a stop by 1992 with the underground excavations being purposely collapsed for safety reasons. The new Vares Processing Plant will be located on the site of the previously operational plant.

3.3 Mining

3.3.1 Mine Site Layout

The Rupice Site comprises of surface infrastructure as well as underground workings (Figure 3.2). The crushing circuit and stockpiles for ROM and waste will be present in the northernmost section of the project footprint area. The central part of the site will house the warehouse, mine storage area, sewage treatment plant, fuel station, power supply infrastructure, other ancillary infrastructure and mine access portals. South of this is the Paste Backfill Plant and potable water treatment plant. To the west of the footprint area is the blasting storage area, at a suitable distance away from other working areas and adjacent to the concession boundary.

3.3.2 Mine Development

Pre-production works (construction of portals, declines, access, ventilation etc.,) for the underground mine are due to start in September 2021. By June 2022 it is anticipated that the first ore will be mined. Approximately 390kt of waste will be removed and some 280kt of ore before commissioning of the VPP begins at the end of 2022. It is estimated that 26,951t of development waste will be generated in the first year and stored at a waste rock stockpile before being used as backfill material (see Section 3.5.6). The waste rock stockpiles will grow and shrink as mining and backfill requirements dictate and will eventually be depleted until a potential waste rock deficit is reached at which point it may be necessary for rock to be brought in from other sources to be used in backfill. Run-of-mine (ROM) material will be stored in one of three stockpiles depending on grade. Stockpile volumes are anticipated to grow during the life of the mine to in excess of 1Mt before being completely depleted as mining activities wind down and processing continues.

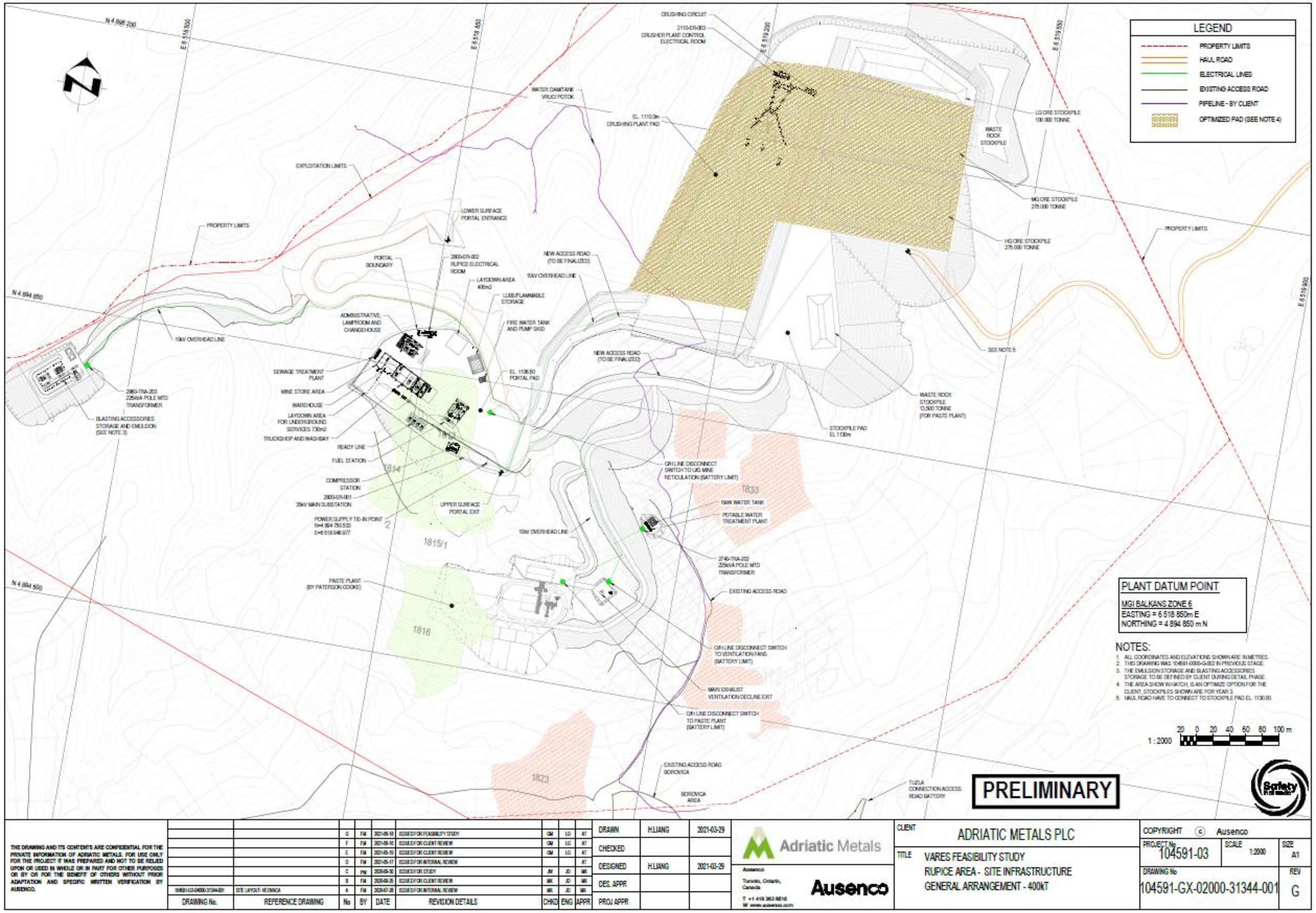

Figure 3.2: Rupice Site Layout

3.3.3 Mine Design

Underground mining at Rupice would comprise two methods; Longitudinal Longhole Open Stoping (LLHOS) and Transverse Longhole Open Stoping (TLHOS), referring to the direction in which the ore body is mined (Figure 3.3). The proposed LLHOS zone is positioned from and above the 1,065 level and the TLHOS zone below the 1,065 level.

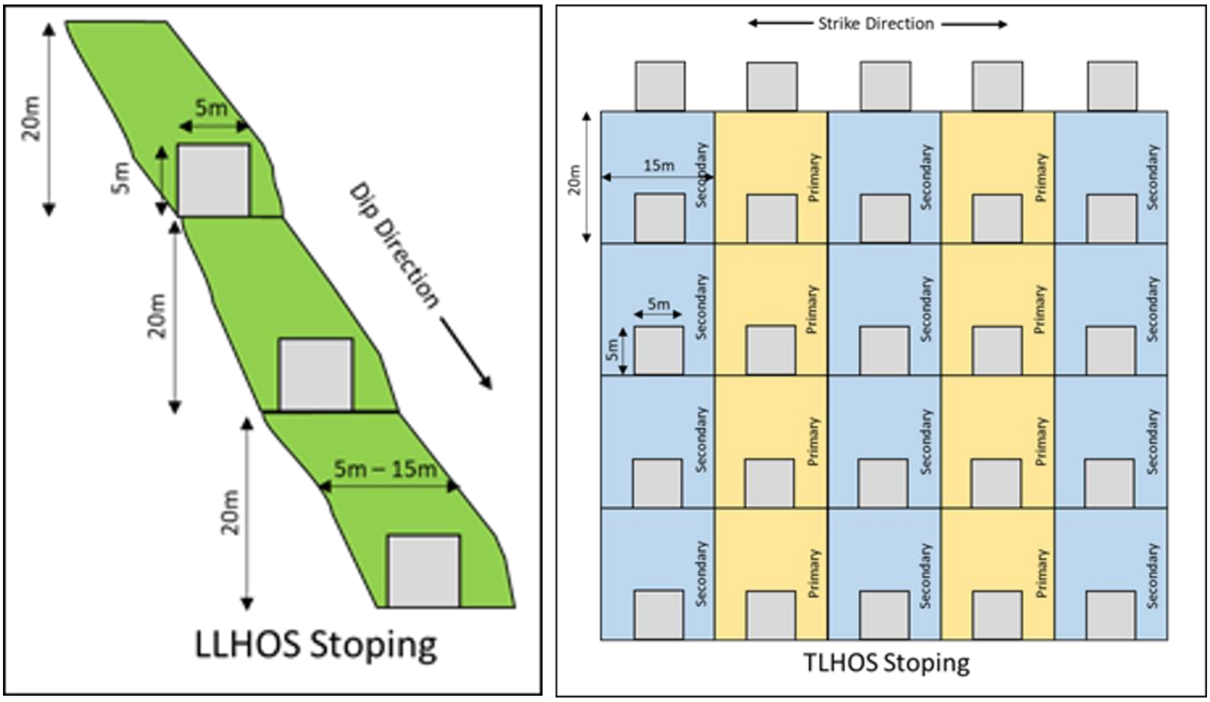

Figure 3.3 Longitudinal Longhole Open Stoping and Transverse Longhole Open Stoping

The primary access to the underground workings will be via two separate access declines developed from surface, suitable for trackless equipment. A third top airway decline will serve as the primary return airway.

The declines will be 5.5m wide by 5.5m high, the top access airway and middle access decline will be developed at a maximum gradient of 14% while the lower decline will be developed at a maximum gradient of 16%. The lower access decline will serve as the main travelling route into the mine while the middle decline will serve as the main means of egress, hence allowing for dedicated traffic in one direction with minimal disruption to the hauling operations.

The decline cross-section area proposed has been selected to allow for future haulage using diesel trucks of 42-tonne capacity, but it could also support a larger 50-tonne capacity truck option. These twin declines are also the essential intake airways into the underground mine.

Several underground stockpiles and re-muck bays are included in the design to allow for passing of equipment and the temporary storage of broken rock. The declines were also developed in a “figure of 8” geometry to allow for better visibility, aid driver fatigue associated with turning in only one direction and to gradually follow the higher-grade zones along the strike of the orebody.

Blasted ore will be hauled to surface via an internal ramp and tipped onto one of three run-of-mine (ROM) pads, depending on grade. The ore will be recovered from the ROM stockpiles by front end loader, with a pre-planned recovery method to achieve the planned grade for feed to the process plant. The front-end loader will discharge into the above ground primary crusher and subsequently conveyed to screens and secondary and tertiary crushers so that blending effectively takes place in the crushing plant. The crushed ore is then deposited onto a stockpile before being reloaded onto on-highway trucks for haulage to the Vares Processing Plant. Further provision has been made underground for additional temporary mine stockpiles at selected positions. The three-stage crushing plant will also be used on a batch basis for crushing or two different sized waste rock aggregates for the backfill.

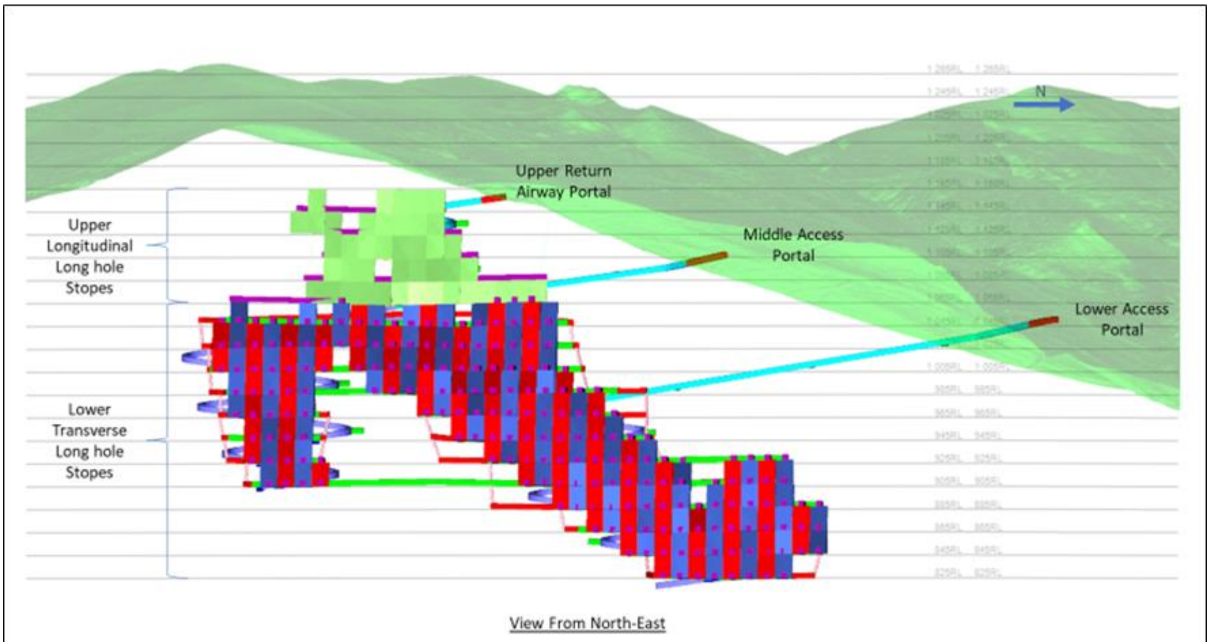

Figure 3.4 Underground Mine Plan

3.3.4 Mining Operations

3.3.4.1 Mining Fleet

The underground mining fleet required for the Project is presented in Table 3.5.

Table 3.5: Underground Mining Fleet		
Equipment type	**Average Requirement**	**Peak Requirement**
Drill Rig - Short hole	3	3
Drill Rig - Long hole	2	2
Drill Rig – Bolter/Support	1	1
Häggloader (optional)	(1)	(1)
Load Haul Dump (LHD)	2	3

Table 3.5: Underground Mining Fleet		
Equipment type	**Average Requirement**	**Peak Requirement**
Truck	3	4
Shotcrete Unit	1	2
Charging Vehicles	1	2
General Service Truck	1	1
Scissors Truck	2	2
Water Cart	1	1
Motor Grader	1	1
Personnel Transport Vehicle	1	2
Light Vehicles	6	6
TOTAL	25 (26)	30 (31)

3.3.4.2 Drilling and Blasting

Drilling activities are separated into short shot-hole, long-shot-hole and support drilling. Different mechanised drilling machines are proposed for each of these activities. Support drilling would be performed by one cable bolt support drilling rig (bolters) capable of drilling long holes for installation of cable bolts and other ground support bolts.

Short hole drilling would be performed by double boom drill-rigs (jumbos). Primary support is a combination of Swellex bolts or grouted bolts and may be performed using the jumbos and bolters where required. Where required, synthetic fibre reinforced shotcrete will be applied up to 75mm thick for long-life access ways using a mobile shotcrete vehicle.

Longhole drilling is anticipated to be performed by a top hammer long-hole drilling machine capable of drilling up to 32 to 35m tubed long holes, 76mm – 89mm in diameter.

Blasting activities will be supported by charge-up crews and utility vehicles modified for the purposes of transporting explosives, blasting accessories and charging of the blast holes. The modified utility vehicles would be loaded at the surface magazines where emulsion will be sensitised and loaded into the special purpose explosives kettle located on the charge-up vehicle. It is planned that water-resistant emulsion explosives would be used in conjunction with cast boosters as a primer and shock tube detonators. The quantity of explosives required per year of operation is provided in Table 3.6.

Blasting would be initiated at fixed intervals at the end of the shift from a central control room once shift clearance procedures are complete. Longhole stoping blast holes will have at least two primer-boosters per hole.

Table 3.6: Quantity of Emulsion Explosive Required per year of operation												
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Explosive (t)	64	640	607	779	817	872	846	780	551	176	224	140

3.3.4.3 Grade Control

Grade control to facilitate detailed grade estimation ahead of mining will be achieved by use of a dedicated diamond drill rig. Diamond-drill grade control holes will be completed, such that diamond core for detailed geological and geotechnical logging, assaying and grade estimation is available a minimum of three months in advance of the stoping production schedule. This grade drilling control is considered an essential, integral part of the mine production sequence, rather than an addition to it.

3.3.4.4 Ventilation

The main ventilation infrastructure includes the return airway decline, return air drives and return air raises. The intake air will travel down the middle and lower declines and into the mine via the internal ramps and onto the levels where it will leave the mine via the return air raises and ultimately exhausted through the upper return air portal. The mine will operate using a "push" ventilation system in year 1, until the main ventilation infrastructure is completed. Once the declines are in place, the mine will convert to a "pull" ventilation system, in time for main stoping and ore production to commence. The "pull" system will then be used for the remainder of the mine life.

3.3.4.5 Dewatering

The Rupice ore body is hosted in Triassic aged dolomitic limestones which are variably confined and overlain by younger, Jurassic aged cherts and sandstones. Six dedicated monitoring wells and piezometers have been drilled into the ore body and a further four hydrogeological wells have been drilled into off-set areas upgradient and downgradient of the ore body. Results from pumping and hydraulic conductivity (K) testing in these installations has generally indicated the dolomitic host rock to be water bearing but with low primary porosity and permeability. Piezometric levels indicate a highly compartmented water bearing unit. Where fracture intersections have been encountered, K values of 10^{-7} m/sec have been recorded although hydraulic conductivity from these analyses ranges over three orders of magnitude and potentially more in certain fault breccia zones. Exploration drilling has encountered sub-artesian and artesian groundwater pressures in some drill holes. The mine will therefore likely encounter inflows and require dewatering, at present estimates have been made on the available data and indicate modest inflow rates in the order of 75 – 125m^3/day (WAI, 2020 Groundwater Inflow Report, PFS). However, this is based on steady-state average conditions and does not reflect the individual, higher inflow and pressure conditions that could be encountered from mining drives intersecting confined fissures, fracture zones, pockets of pressurised water. The dewatering system at this stage is envisaged to comprise collectors, sump drainage, gallery pumps and lifts to surface. Further data collection and numerical modelling is being undertaken to better evaluate the potential range of inflows and pore-water pressure conditions in the mine using up to date groundwater and exploration drill data. The final dewatering (and or depressurising) design will be completed post DFS.

3.3.4.6 Loading

The loading of blasted feed material and waste as well as the backfilling of the stopes will conceptually be achieved using a single type of load haul dump unit (LHD) model and size in order to minimise the inventory of equipment spares.

3.3.4.7 Hauling

Transport of feed material and waste to surface is proposed to be achieved by the loading of broken rock into 42-tonne class diesel haul trucks and hauling via the main transport drives, ramps and exit decline to surface. The proposed cross-sectional dimensions of primary and secondary development have the potential for a 50-tonne class truck to be used.

3.3.4.8 Crushing

Run-of-Mine (ROM) material will be deposited in one of three ROM stockpiles. A front-end loader will reclaim ore from the stockpiles and deposit it into the blend ore bin. The ore bin has a capacity of 75t and will be equipped with a 600mm static grizzly to prevent oversize material from entering the crushing circuit. A vibrating grizzly feeder will feed the material from the bin to the jaw crusher which will allow finer material to bypass the crusher.

During operation, three-stage crushing will occur above-ground at the Rupice site before crushed ore is trucked to VPP. The crushing circuit is also used to crush waste rock for use in backfill. The primary crusher will be a single-toggle jaw type crusher and will be designed to reduce the feed size from 80% passing of 427mm to 101mm. The secondary cone crusher is operated in an open circuit and will reduce the feed size from 80% passing of 96mm to 28mm. The tertiary cone crusher is operated in closed circuit with the sizing screen and reduces the feed size from 80% passing of 28mm to 14mm. The undersize of the sizing screen provides the final product of the crushing circuit and produces a 80% passing crushed ore product of 8mm. Crushed ore will be trucked from the Rupice site to the Vares Processing Plant and end-dumped into a crushed ore hopper with a capacity of 37.5t.

3.4 Haul Route

3.4.1 Haul Route Design

The proposed haul route is 24.5km long and has been designed to utilise 9km of existing roads and forestry tracks where feasible, as well as creating 15.5km of planned new road (See Figure 3.5). The road is to be upgraded, developed, and maintained by the municipality; it will be kept within their responsibility post-closure though construction and maintenance during mine operation will be paid for by Adriatic. The haul route will be a multipurpose road, accessible for forestry purposes and to the general public. Some sections of the road will be tarmaced to minimise noise and dust in areas close to residential properties. These sections are shown in Figure 3.6.

There are several haul routes with different purposes for the Project: between the Rupice site and VPP, VPP to Droskovac Rail Loadout, and VPP to the TSF.

The main haul route, that between Rupice and VPP is awaiting detailed design though is expected to be 5m wide plus 0.5m berm and 0.5m shoulder, totalling 7m in width. The route has been designed to ensure then entire route has a gradient of less than 10% and routing has been selected based on this, as well as the underlying terrain and to utilise existing roads as far as possible. This route traverses predominantly through forestry and meadow land, discussed in Chapter 4.6 Landuse Baseline. West of VPP, the haul route follows the Zagarski stream, part of which has been previously culverted to make way for a forest access track. An additional approximate 1km of the Zagarski stream is likely to be culverted for the development of the haul route, subject to final design.

3.4.2 Haul Route Operations

Ore and tailings haulage will be undertaken by a contractor, yet to be determined. Estimated daily vehicle movements will consist of 91 vehicle movements per day or 4.33 full loops per vehicle per day along the route between Rupice and Vares Processing Plant. The following key assumptions for hauling ore between Rupice and the Vares Processing Plant would involve:

- 2000t of ore to be transported from Rupice to Vares Processing Plant daily;
- 22t capacity of trucks; and
- 21 trucks in the fleet.

It is assumed for the haul route to the Rail loadout that 180,000t of concentrate will be transported annually, with 25t per container, on a 350 day per annum operation and 7 trucks in the fleet. Overall, this equates to 21 vehicle movements per day, or 3 full loops per vehicle per day.

The haul route between the Processing Plant and the TSF will haul an average of 1313t dry tailings per day (457t minimum – 2157t maximum) daily. The VPP to TSF route leaves VPP on the south-eastern side of the site, traverses southward, following contours. Several branches of road have been developed to facilitate multiple phases of tailings stacking (see Section 3.6.1).

Movement on all routes will be 24 hours operations with a speed limit of 30km/hour. Drainage ditches will be in place at the side of roads, and culverted where required.

During construction, materials and equipment will be brought to site via road. , Once operational, as many movements as feasibly possible will be made via rail.

Figure 3.5: New and Upgraded sections of Haul Road

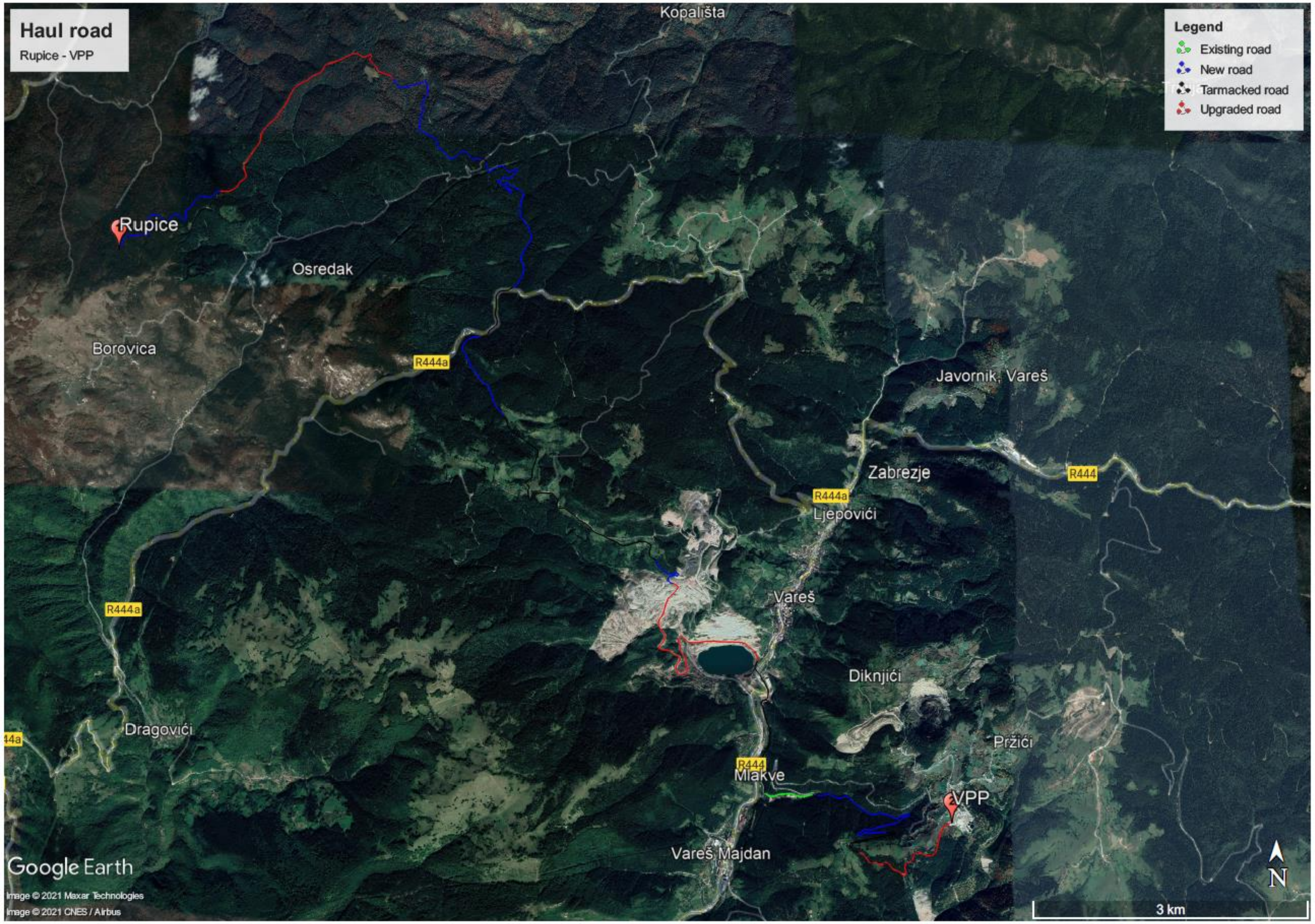

Figure 3.6: Tarmaced Sections of Haul Route

3.4.3 Haul Route Health and Safety

The Haul route will be accessible by forestry operatives as well as the general public, like many of the existing public roads in the area outside of Vareš, meaning community health and safety is critical to its management. The exception being the route leading to the TSF which will be for project use only.

No lighting will be installed on the haul route. Legally required road signage will be erected as well as signs disclosing the usage of the road by Adriatic Metals and for forestry purposes. Community members will be encouraged to avoid use this route and continue using the existing and more direct road through villages. During winter months and snowy periods road clearance will be undertaken on the haul route to ensure year-round access is possible. A traffic management plan has been developed which covers the use of the haul route and is available as part of the ESIA package.

3.5 Vares Processing Plant

3.5.1 Plant Layout

The Vares Processing Plant (VPP) is located in the village of Tisovci, approximately 11km as the crow flies east of the Rupice site and receives ore from the Rupice underground mine.

The VPP site is a brownfield site, previously housing the process facility for the Veovaca Open Pit, operational until the late 1980s. Existing buildings and concrete structures have been demolished and barite removed from site, in accordance with demolition permit UPI/03-19-2-83/20. Note, the historic tailings thickener is to be re-used as the process water tank in the design. A new Tailings Storage Facility is to be proximal and south of VPP.

The processing plant will consist of:

- Coarse ore handling facility;
- Grinding circuit;
- Flotation circuits: Silver-lead flotation and Zinc flotation both comprised of rougher flotation, regrind circuits, and cleaner flotation;
- Concentrate thickening and filtration;
- Tailings thickener and filtration;
- Concentrate loading;
- Reagents handling and storage areas; and
- Noise barrier.

Process water tank and ore storage bins will be to the south-east of the site, the grinding circuit, roughers and cleaners will be to the east, reagents storage and administrative buildings to the north, and concentrate and tailings thickening and filtration and concentrate load-out to the central western part of the site. The planned plant site layout is shown in Figure 3.7:.

Photo 3.2: Vares Processing Plant Site Pre- and Post-demolition

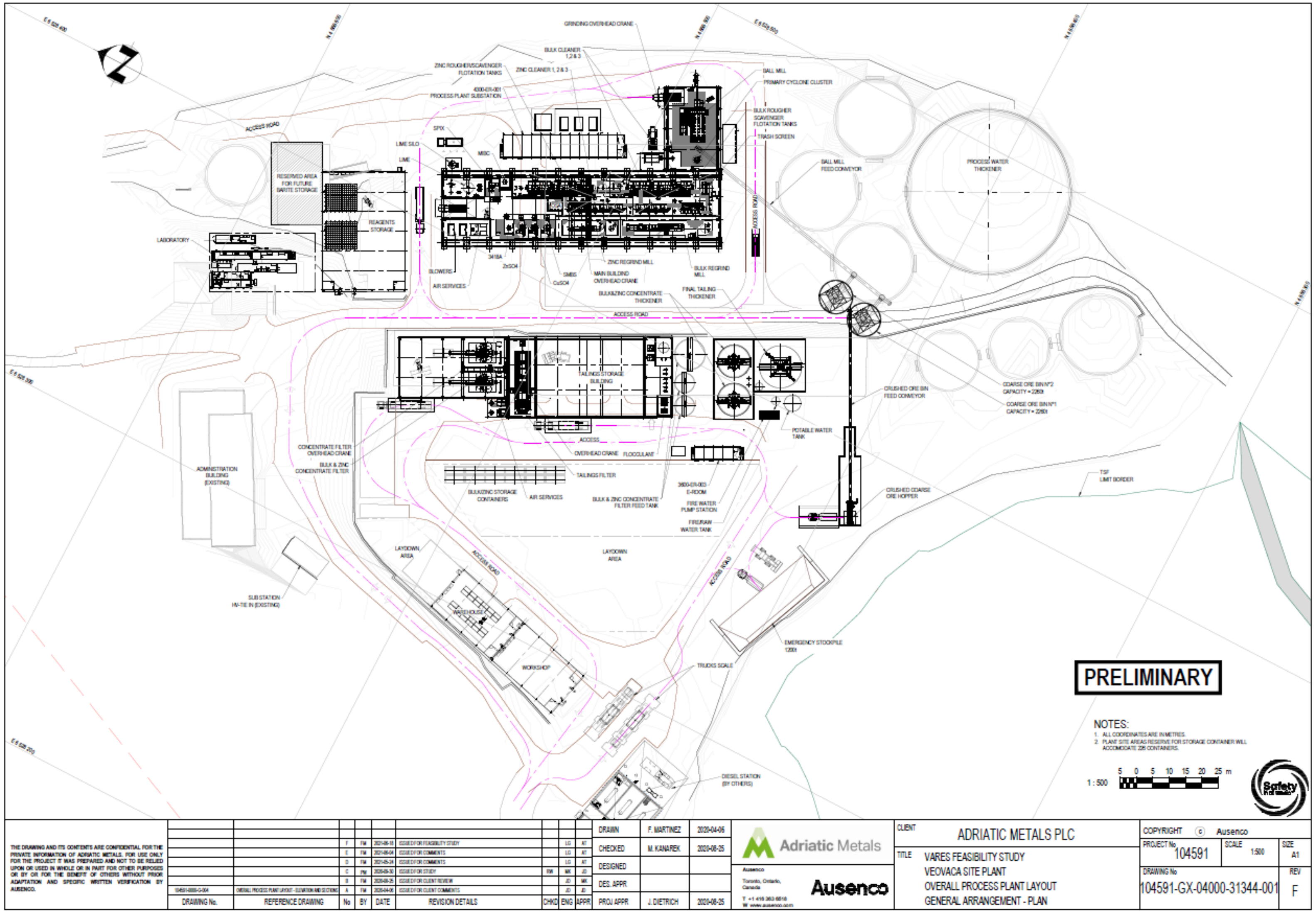

Figure 3.7: Vares Processing Plant Layout

3.5.2 Plant Design

VPP has been designed to conform with best practice standards to minimise environmental, social and occupational health and safety impacts and risks.

Several design aspects have been implemented to ensure appropriate ventilation throughout, to minimise dust impacts, and to ensure temperature is maintained for OHS purposes, as follows:

- Grinding building – building exhaust fan and electrical space heater;
- Flotation / Main building - building exhaust fan and electrical space heater;
- Reagent area / Main building – dust collector, building exhaust fan, fresh air fan and electrical space heater;
- Reagent storage building - building exhaust fan, fresh air fan and electrical space heater
- Laboratory – HVAC;
- Silver-Lead / Zinc concentrate storage buildings, tailings storage building - building exhaust fan and electrical space heater;
- Air service room, feed tank & air service / concentrate building - building exhaust fan and space heater (electrical or electrical heater);
- All admin buildings, maintenance building, warehouse, control room & MCC – HVAC system, typical design temperature:
    - Admin building / Control room / E room / Lab: 20 deg C winter (min), 24 deg C summer (max);
    - Office enclosure / warehouse: 18 deg C winter (min), 24 deg C summer (max);
    - Maintenance building: 18 deg C winter (min), 28 deg C summer (max);
- Emergency stockpile & crushed ore receiving hopper will be enclosed with dust collector; and
- Coarse ore day bins – Bin vent; conveying system – dust collector at transition points.

The plant design also considers potential noise disseminating from processing operations. All buildings will provide a minimum of 40Rw through the building material, cladding and insulation. A 5.12m high noise barrier may be installed along the north-western side of the plant site following a final review of the insulation of the buildings.

3.5.3 Processing Operations

The process design for the Vares project is based on the mine plan and corresponding feed grades, metallurgical test-work, and Ausenco's in house database. Rupice mineralisation is amenable to concentration through sequential flotation circuits producing saleable silver-lead and zinc concentrates.

During operation, three-stage crushing will occur at the Rupice site and the crushed ore will be trucked to VPP. Crushed ore will be received and stored in two crushed ore bins prior to the ball mill feed conveyor. Once at VPP, crushed ore will go through a grinding circuit, designed to further reduce ore from an 80% passing size of 8mm to 40µm.

The cyclone overflow reports to the sequential flotation circuit, which consists of silver-lead flotation and regrinding and zinc flotation and regrinding. The process produces two saleable concentrates, (silver-lead and zinc), that are subsequently thickened, filtered, and placed in sealed shipping containers for transport.

Tailings from the facility reports to a tailings thickener and filter press where the material is dewatered to produce filtered tailings, and the resulting process water is recycled to the facility. This arrangement results in a high-water efficiency, minimising makeup water requirements. The filtered tailings are then trucked to the Rupice site for use as backfill in the underground mine or trucked and placed within the dedicated TSF. The plant has been designed around optimised metal production during the first 3 – 5 years of operations. Throughput is constrained by flotation capacity or mill power depending on ore grade/hardness. Approximate plant capacity is to accept a throughput of 800kt/y.

Table 3.7: Process Recoveries

Metal	Recovery in Zn conc	Recovery in Ag-Pb
Zn	80%	11%
Pb	7%	86%
Cu	14%	80%
Au	24%	40%
Ag	18%	71%
Sb	6%	88%

3.5.4 Reagents, Supply, Storage and Handling

Reagents that will be used at VPP are given in Table 3.8. These will be received onsite at dedicated storage areas in the northern corner of the Plant site, prior to mixing and dosage to the process.

Each reagent will be managed, stored, and disposed of as per the correct method per reagent. Logistics regarding the reagents including transport information and volumes of each reagent is detailed in Table 3.8.

Table 3.8: Vares Processing Plant Reagents

Reagent	Delivery Quantity (t)	Delivery Transport Method	Delivery Frequency
Quick Lime	25	Truck silo 25 t (in bulk)	19 deliveries per year, every 19 days
Sodium metabisulphite - SMBS	22	Bags 25 kg	49 deliveries per year, every 7 days
Zinc Sulphate (Heptahydrate) - ZnSO4	22	Bags 25 kg	44 deliveries per year, every 8 days
Copper Sulphate (Pentahydrate) - CuSO4	22	Bags 25 kg	20 deliveries per year, every 18 days
Aerophine 3418A	20	IBC container	3 deliveries per year, every 120 days

Table 3.8: Vares Processing Plant Reagents			
Reagent	**Delivery Quantity (t)**	**Delivery Transport Method**	**Delivery Frequency**
Methyl Isobutyl Carbinol - MIBC	20	IBC container	5 deliveries per year, every 73 days
Sodium Isopropyl Xanthate - SIPX	20,8	Steel drums 150 kg	7 deliveries per year, every 52 days
Magnafloc 10 (flocculant)	20	Bags 25 kg	2 deliveries per year, every 182 days

3.5.5 Concentrate Streams

The two concentrates, silver-lead and zinc, to be produced at the Vares Processing Plant will contain a number of associated or contaminant elements. The expected average for elements for 0-24 months is given in Table 3.9.

Table 3.9: Concentrate Stream Elements			
Elements	**Unit**	**Zinc Concentrate**	**Silver-Lead Concentrate**
Zn	%	55-58	8-12
Ag	g/t	300-600	1500-4000 (Ave 2600)
Au	g/t	3 - 8	5-10
Cu	%	0.5 to 1	6-10
Pb	%	2.50	43-49
Al	%	0.1	0.13
Ba	%	3-4	0.5-1.5
Bi	ppm	1	5
Ca	%	0.1-0.3	0.15
Fe	%	0.7-1.4	2-4
K	%	0.03	100-200
Mg	%	0.08	0.05
Mn	%	0.028	100
Mo	ppm	90	40
Na	%	0.02	<0.02
Ni	ppm	85	80
P	ppm	100-200	100
S	%	>20	>20
SiO2	%	0.8-1.5	0.2-.3
Sn	ppm	5	2
Ti	%	<0.01	<0.01
W	ppm	1	<1
Zr	ppm	<5	<5
As	%	0.07-0.1	0.5

Table 3.9: Concentrate Stream Elements			
Elements	**Unit**	**Zinc Concentrate**	**Silver-Lead Concentrate**
Cd	%	0.25-0.35	600-700
Co	ppm	2	<1
Cr	ppm	50-150	30
Li	ppm	<2	
Re	ppm	0.09	
Sb	%	0.05-0.2	
Sr	ppm	133	
Te	ppm	<1	
Tl	ppm	15	10
V	ppm	43	12
Cl	ppm	<50	<50
F	ppm	<20	<20
Hg	ppm	400-700	400-900
Se	ppm	<10	

Both concentrates that will be produced, (Zinc and lead-silver) will be transported from the Vareš Rail Head (Droskovac) to market. Marketing work to date indicates a risk of high penalty elements namely mercury reducing the options for smelters who will take the material. Initial discussions indicate that the zinc concentrate will largely have a European market and be transported via rail. Additionally, railways from Vareš to the port of Ploče, Croatia, are expected to be used to transport concentrate for shipment to regions other than Europe. The rail head is an existing building currently in poor condition. The Project will reinstate it as an operational facility, and it will therefore be treated as an associated facility throughout the ESIA.

3.5.6 Backfill

As the mine develops, a programme of backfilling will be undertaken, minimising the need for waste disposal on the surface, and improving land stability post-closure. A backfill plant will be constructed at Rupice where two separate products will be produced: Cemented Aggregate Fill (CAF) and Paste Aggregate Fill (PAF).

Tailings material will be trucked from VPP to the backfill plant at Rupice. Material stockpiles for filtered tailings and aggregate at the backfill plant location are required, and drainage will be in place around this area. The paste backfill plant combines concentrator tailings and crushed aggregates/waste rock (12mm) with a cement binder to produce a product suitable for deposition as backfill. During the early stages of the operation, no tailings material is available so CAF will initially be produced, before transitioning to both CAF and PAF once tailings material is available. The paste backfill is then pumped to the underground reticulation system via a borehole close to the backfill plant.

The selection of the backfill product is made on a stope-by-stope basis based on the strength requirements for the extraction sequence. Backfilling of waste (when available) into the open stopes as CAF would utilise the same class 14-tonne LHD, but stope backfilling will mostly utilise the backfill plant and reticulation system.

The requirement for backfill material will fluctuate across the life of mine, as shown in Figure 3.8. To accommodate total backfill requirements the volume of tailings, aggregate and cement is given in Table 3.10.

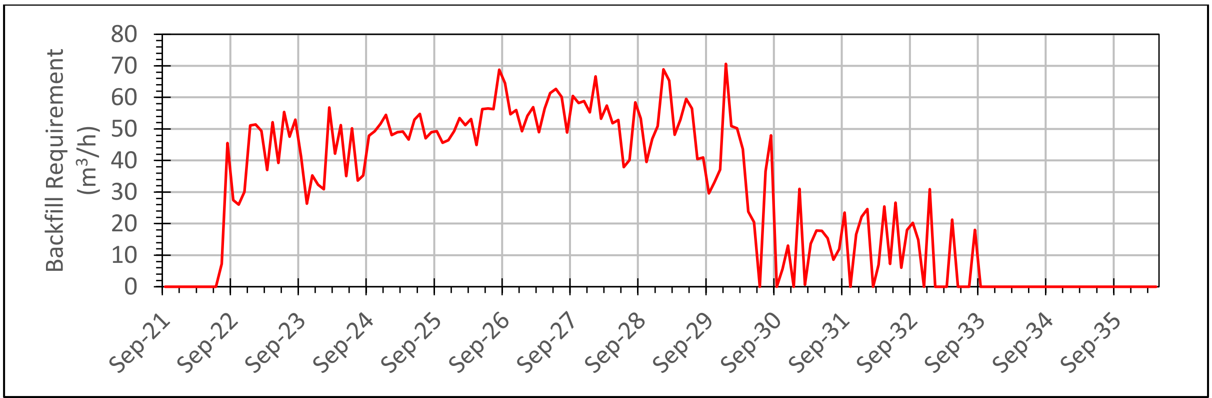

Figure 3.8: Backfill Delivery Requirement

Table 3.10: Backfill Inputs		
Tailings	*tdry*	1,167,562
Aggregate total	*tdry*	2,377,800
From Development Waste	*tdry*	2,206,530
External / Veovaca Sourced	*tdry*	171,270
Cement	*tdry*	226,193

3.6 Waste Management

3.6.1 Tailings Storage Facility

3.6.1.1 Design Parameters

The proposed area of the TSF is immediately south of the VPP area in a thickly wooded and steeply sided valley (Figure 3.10). An existing track runs along the eastern ridge of the site with a forestry track forming the western extent with meadows beyond and the proposed mine haul route. The southern extent of the area is marked by the licence area boundary beyond which a historic iron ore mine waste dump restricts access into the valley. Tailings will be transported from the processing facility to the TSF by trucks via a purpose-built access route, as shown in Figure 3.10.

A powerline and associated 10kV pylons cross the site in a NNE-SSW orientation at the northern end with one pylon located close to the TSF footprint on the western flank of the valley. Several derelict buildings are also located close to the pylon location. The pylon will be removed as part of the site preparation works and relocated outside the TSF footprint.

No dwellings or farmland are located immediately downstream of the TSF site, and with exception of the derelict buildings, no buildings are located within the impoundment footprint.

The design and placement of the TSF was assessed through an optioneering study, which considered project economics as well as land acquisition, environmental and social influences. The different alternatives reviewed are discussed in Chapter 6 of this ESIA. An upstream dry stack TSF was selected due to insufficient land being available in the concession boundary to build downstream embankments.

The Design Parameters and Assumptions for the TSF are detailed below in Table 3.11.

Table 3.11: Design Parameters and Assumptions (Tailings)

Production and Operation	Value	Comment
Production (annual)	0.4Mt/a	Based on V6.4 production schedule
Production (total)	5.03Mt (dry)	Reporting to TSF
Tailings Volume	2.5Mm^3	Based on 85% MDD
LoM	12 years	Dry stack tailings only produced after month 19 after processing begins.
Tailings moisture content	8.7-9.3%	Metso-Outotec minimum filter moisture content
Tailings return water	0%	Assumed no bleed water, surface water balance to be undertaken
Tailings Properties		
Optimum Moisture Content	10.2%	Reduce filtration to achieve optimum moisture content.
Maximum Dry Density	2.46t/m^3	
Compacted density – assumed 85% of MDD	2.09t/m^3	Assumed for volumetric requirement
Permeability at MDD	8.1 x 10^{-9} m/s	Permeability in Triaxial Cell
Atterberg	Non-Plastic	
Cohesion	0kPa	
Angle of Shear Resistance	36.0 degrees	
Grind size p80	38 microns	Metso-Outotec test results

To intercept and direct surface water flow away from the impoundment area, diversion ditches will be constructed around the perimeter of the facility. Any contact and seepage water will be captured in drainage ditches and be pumped back to the process plant or be used for dust suppression and moisture control of the tailings. The lining system has been designed to collect any groundwater seepages and channel them through the drainage blanket to the bottom of the valley and out through the base of the embankment via a drainage pipe. A HDPE liner will be placed over the top of the drainage layer to prevent the tailings coming in contact with the drainage system. The stream in the valley bottom will be culverted with a slotted pipe surrounded by geotextile and gravel back to direct stream flow below the liner system. The stream culver will pass below the base of the embankment via a solid pipe before discharging below the embankment footprint.

3.6.1.2 TSF development

The TSF will be produced in three stages, consisting of an initial area followed by two subsequent expansions. It will have an initial capacity of 0.97Mt followed by 1.73Mt and 2.56Mt creating a total storage capacity of 5.3Mt. Locally sourced rock will make up the zoned starter embankment at the toe of the facility, with upstream construction of compacted filtered tailings being used to develop the facility. The facility will be progressively closed and capped with a low permeability layer covered with waste rock to prevent erosion before cover with topsoil to encourage natural revegetation. This design mitigates potential negative effects both during operation and post-closure, such as acid rock drainage. A cross section of the final TSF is shown in Appendix 3.1.

Total tailings production for the 13-year LoM is estimated as being approximately $6.2Mt_{(dry)}$, with 5Mt of the dry tailings reporting to the TSF and 1.2Mt using in backfill. Tailings will not initially report to the TSF but rather be used as backfill. Tailings will first report to the TSF 19 months after processing has commenced. The average monthly tailings production rate is approximately 39,000t/month but monthly production figures vary depending on development, stoping programming, and paste backfill requirements. Figure 3.9 shows the split between tailings reporting to the TSF, and those to be used in backfill.

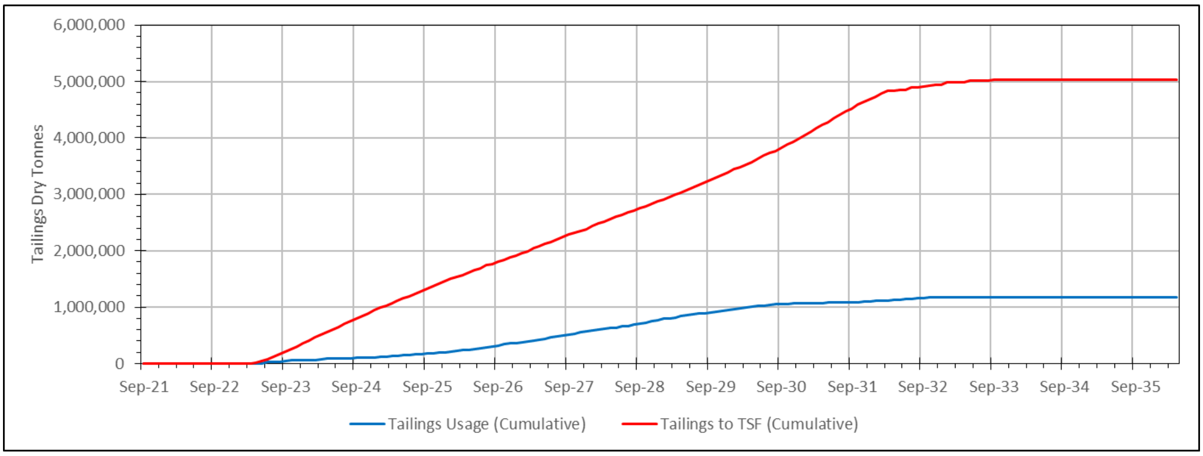

Figure 3.9: Tailings Balance Across LoM

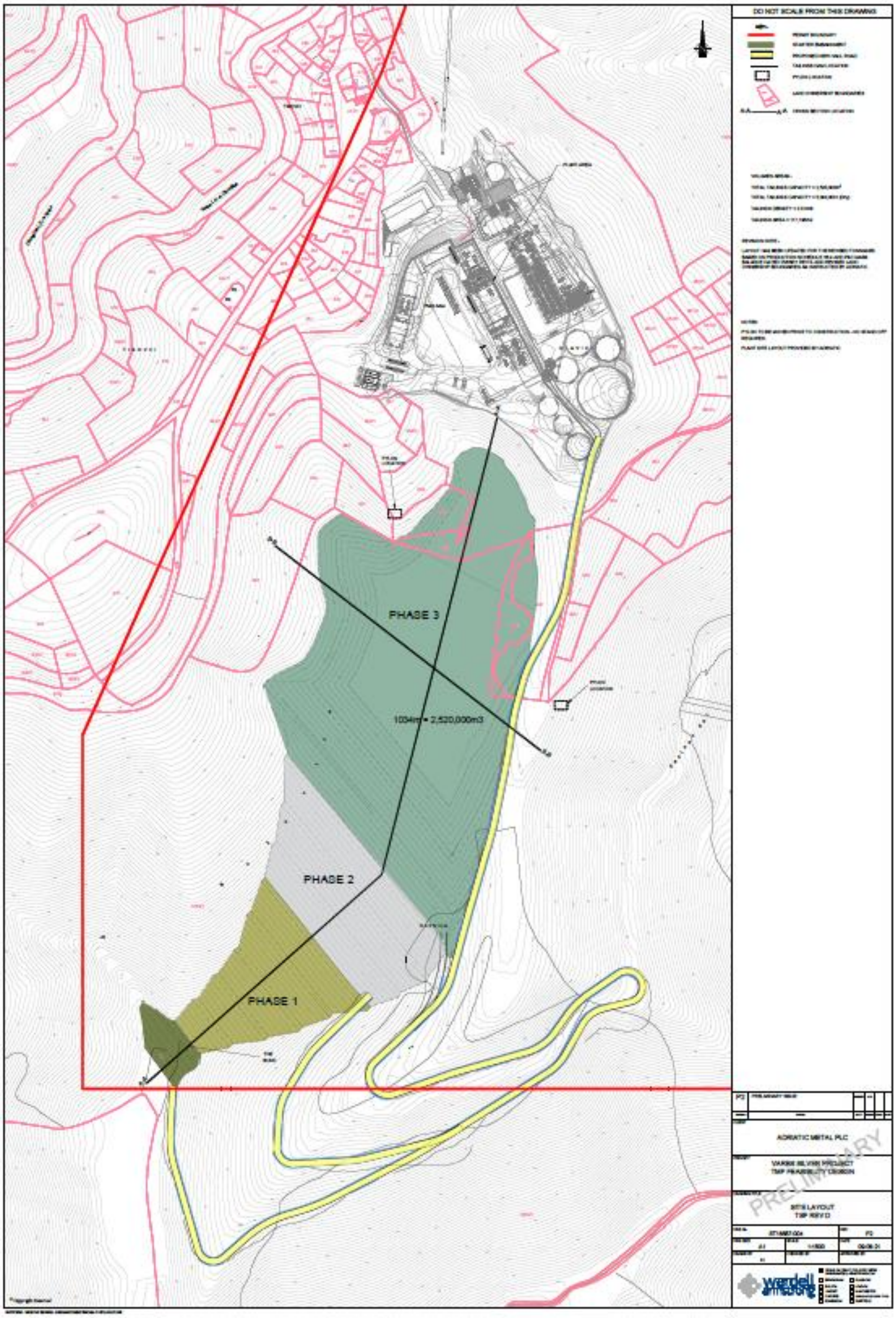

Figure 3.10: Tailings Storage Facility Layout

3.6.1.3 TSF Monitoring

During operation the TSF will be monitored for water quality of both the groundwater and surface water upstream and downstream of the facility on a monthly basis. Settlement monitors will be installed on the embankment to allow routine settlement and movement monitoring to be undertaken. Dust and noise levels to confirm compliance with the operational management and environmental standards will also be undertaken.

3.6.1.4 Consequences Assessment

The TSF has been designed in line with the Global Tailings Standard on Tailings Management, August 2020[2]. These standards assess the potential impact of a facility against several key areas to identify the potential risk and the potential consequence in the event that a failure occurred so that a Consequence Classification can be assigned. The higher the consequence classification the more stringent the required design parameters are.

Based on the Consequence Classification Matrix the TSF is considered to be a Low Risk Classification as there is no population at risk; no loss of life would occur; minimal short-term loss or deterioration of habitat or rare or endangered species; there would be minimal effects and disruption of business and livelihoods and no measurable effect on human health; no disruption of heritage, recreation, community or cultural assets; low economic losses and the failure area contains limited infrastructure or services. In the event that a failure occurs, the tailings are highly unlikely to liquify and flow, as such the extent of the area potentially impacted is limited to the immediate area downstream of the stack. Due to the historic waste dump at the mouth of the valley any tailings failure would predominately be confined within the TSF valley.

The designers risk assessment undertaken as part of the design process has assessed the likelihood and potential of various failure mechanisms including: liquefaction of tailings during a seismic event, bearing capacity failure of foundation strata with settlement and slope instability in tailings, embankment failure in circular or non-circular shear slip surfaces with tailing release into surrounding environment and water courses, erosion and transportation of tailings during storm events , rockfall within TSF valley, and overtopping of contact water in the TSF impoundment and water collection pond. Where required, mitigation measures have been identified and incorporated into the design. The designers' risk assessment is included in Appendix 3.2.

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[2] https://www.icmm.com/website/publications/pdfs/environmental-stewardship/2020/global-industry-standard-on-tailings-management.pdf

3.6.2 Waste Rock Stockpile

A permanent waste rock dump will not be required for the Project. Instead, a waste rock stockpile will be used with an estimated 8-year life expectancy (Figure 3.11), located in the north-eastern corner of the Rupice footprint, adjacent to the crushing facility. Waste from the underground mine will be placed into the stockpile before being used in backfill. The maximum capacity of the Waste Rock Stockpile will be 744,419t, in April of Year 6 (2026). After 8 years, there will be a waste rock deficit where rock will then be required to be sourced externally to be used as backfill.

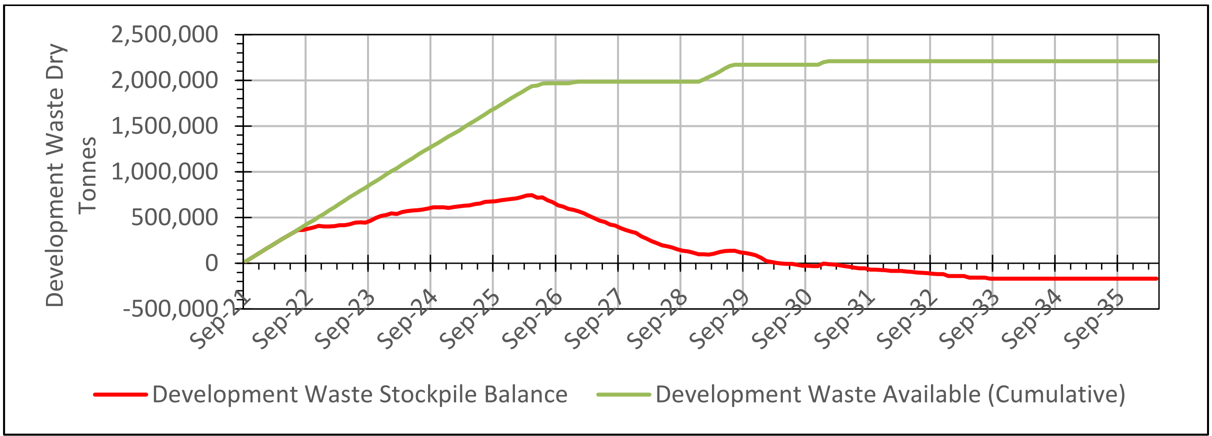

Figure 3.11: Waste rock stockpile balance.

The Waste Rock Stockpile will be lined to collect potential ARD ML and prevent seepage of this to groundwater. The material for the liner has not yet been determined. An ARD treatment plant will be present below the waste rock stockpile, the design of which will be finalised at detailed design phase. The treatment plant will also treat seepage which is collected from the ore stockpiles and other contact water.

3.6.3 Non-mining Waste

Waste Management Plans have been developed for permitting requirements for both VPP and Rupice, in September 2019 by Enova, and March 2020 by Tuzla Institute, respectively. Waste Management Plans has been developed in accordance with the Waste Management Law of BiH, and relevant EU environmental directives, including the Waste Framework Directive (2008/98/EC). Both plans will be maintained and updated as the Project design progresses.

Non-mining waste that will be produced solely during construction, predominantly from the demolition of the Process Plant, includes:

- Earth, sand, gravel, metals, clay, rock, vegetation – resulting from excavation works;
- Bitumen (asphalt) or cement bound material, sand, gravel, crushed rock – resulting from civil engineering construction activities;

- Concrete, brick, mortar, gypsum, lightweight concrete, natural rock – resulting from demolition of existing buildings; and
- Wood, plastic, paper, cardboard, metals, cables, paint, and other mixed waste.

Non-mining waste that will be produced during construction and operations includes:

- Domestic waste;
- Spent oil and grease from the process area, generators, and maintenance facilities;
- Waste oils, fuels and lubricants;
- Materials contaminated with oil and grease;
- Reagent packaging; and
- Metal scrap, scrap tyres, batteries and accumulators, paints and varnishes.

The waste manager will maintain a record of all waste types and quantities as well as waste storage and removal and final disposal location. Non-mining waste will be collected separately, properly stored and delivered or collected by the legal entity authorised for each type of waste. Prior to collection or disposal, waste will be stored to ensure:

- Hazardous wastes are not mixed with non-hazardous wastes;
- Waste must not be spilled or dissipated as a result of inadequate waste treatment or natural phenomena;
- Liquid waste and waste water must not be discharged into drains, water courses or surrounding land;
- Protection from vandalism, theft, manipulation by unauthorised person and animals or any other type of adversity; and
- Waste must not leave negative consequences for the environment or be a form of disturbance due to disagreeable smell or violation of aesthetic characteristics and values of landscape.

3.7 Utilities and Supporting Infrastructure

3.7.1 Power Supply

A national electricity grid is operated and maintained by the State company, JP Elektroprivreda BiH. At VPP there is a historical 35kV tie-in connection available connecting the HT electrical network to the main substation next to the administrative building, which supplied the former operations. This is expected to be stepped down to 6kV for power distribution. This 35kV/6kV substation will supply power to the process plant and administrative building and other infrastructure.

The existing power distribution network infrastructure consists of a north-south 220kV and 400kV line in proximity to the town of Vareš. Additional 132kV network lines run north-south close to the Rupice mine site, alongside the main sealed road R444a. Elektroprivreda have proposed to supply Rupice from a sub-station in Vareš Majdan via a 35kV buried cable that will run next to the haul road connecting Rupice and VPP.

The existing 132kV line would be stepped down to 35kV and 10kV for distribution to the transformer yard located at the Rupice mine site. The new 35kV buried distribution is expected to deliver 8.9MW within the Rupice site area. The 10kV feeders would be used for distribution to the underground workings, paste-fill plant, main ventilation fans and the workshops. The voltage would be further stepped down to a suitable voltage for the specified motors. It is proposed that 1MW emergency generator be installed at the Rupice mine site to main ventilation fans and pumping infrastructure during a power cut.

A solar power plant has been built at Tisovci admin building in accordance with the Law on Use of Renewable Energy Sources and Efficient Cogeneration, (Official Gazette of the FBiH; No. 70/13). The annual production of the solar plant is anticipated to be 43901kWh with the solar panels being located on the roof of the admin building. The power plant is expected to reduce CO_2 emissions by 20,633kg/year.

Anticipated power requirements for the Project have been calculated for the Vares Processing Plant and for the Rupice site, see Table 3.12.

Table 3.12: Average Annual Electrical Consumption during Operational Phase of Mine

	Installed Cap	Nominal Demand	Operating Hours Per Year	Consumption
	kW	kW	(h/y)	kWh/y
Rupice Mine				
Crushing Plant	1,215	736	5,694	4,188,551
Blasting/Warehousing	260	189	5,694	1,074,888
Rupice Services	1,993	1,353	5,694	7,706,222
Total				**12,969,660**
Vares Processing Plant				
Coarse Ore Handling	337	219	8,000	1,749,533
Grinding	2,668	1,638	8,000	13,102,594
Flotation	3,397	1,872	8,000	14,976,203
Concentrate Handling	586	407	7,200	2,930,926
Tailings Handling	456	324	7,200	2,334,000
Reagents Handling and Storage	238	179	8,000	1,429,733
Plant Services	1,513	941	8,000	7,524,988
Fuel Storage and Distribution	104	78	8,000	624,490
Non-process Infrastructure	571	429	8,760	3,754,286
Total				**48,426,752**
Grand Total				**61,396,412**

3.7.2 Communications

Telecommunications in BiH comprise of licensed fixed telecommunication operators with a highly competitive mobile sector covering 99% of the population with a 63.29% penetration rate operating on 4G+ network. The mine site will be linked to a data and voice telecommunications network via a satellite receiving station or cellular network repeater station. Communications on site will link the public network to the various voice, data and telemetry infrastructure systems within the local mine network using fibre optic cable which will support both data and voice communications.

A repeater system will provide the infrastructure to enable hand-held and mobile radio sets to communicate around the site.

3.7.3 Fuel Supply, Storage and Handling

At Rupice, a diesel station will be located on the infrastructure pad next to the mining portal for ease of access to mobile and mining vehicles. The fuel station will consist of a 30m (long) x 20 m (wide) open-air, reinforced, concrete containment area located adjacent to the truck shop and washbay, in the central part of the site. The storage area will be bunded to prevent spillage of fuel contaminating the site area or watercourses. The fuel station will service light vehicles, on-site mine equipment, mobile fleet and the backup generators.

Diesel fuel storage and supply will be delivered in tanker trucks by commercial suppliers and will include a total volume of 45 m^3 of fuel storage at each site, plus offloading pumps, dispensing pumps, associated piping and electronic fuel control/tracking.

At Vares Processing Plant a diesel station will be utilised for the haul trucks and mobile equipment around site. This is located at the southwestern corner of the site.

Table 3.13: Predicted Diesel Fuel Requirements During Operation

	Ave Diesel Requirements	Ave Diesel Requirements
	000 litres/annum	Tonnes/year
Rupice underground operations	906	802
Rupice surface operations	1,164	919
VPP Operations	283	251
Ore Haulage	345	305
Tailings Haulage	297	263
Container Transport	867	767
Staff Transport*	265	234
Total	**4,127**	**3,541**

Notes:
Tonnes per year estimated based on 365 day/yr operation, assuming diesel density of 835kg/m3
*Estimate

3.7.4 Ancillary Buildings (Rupice)

Ancillary facilities at Rupice include the administrative, lamproom and change house building, workshop, warehouse and washbay building adjacent to the workshop, fuel and lube storage building, mine storage building and compressor building.

The administrative, lamproom and change house building will be a single-storey, steel frame building with sandwich panels. The mining office and change room facilities were assumed to be constructed in the mine facility area and will be approximately 400 m2. These facilities will have clean and dirty areas and will be complete with showers, basins, toilets, lockers and overhead laundry baskets. There will be on-site laundry to reduce contamination from the movement of clothing around site and off site.

The workshop, warehouse and washbay building at the site will be a 16 m (wide) x 75 m (long) fabric building located southwest of the fuel station. The building will be used to maintain mining trucks and for spare parts storage. The mining truck maintenance bays will be serviced by a 10t bridge crane, supported on steel framing independent of fabric building framing. The building will be supported on a reinforced concrete raft foundation.

The fuel and lube storage building will be located northwest of the workshop building. The building will be a 22 m (long) x 15 m (wide) fabric building that will be used as a warehouse for lube and fuel as well as general storage. The building will be supported on a reinforced concrete raft foundation.

The mine storage building will be located southwest of the fuel and lube storage building. The building will be a 24 m (long) x 15 m (wide) fabric building that will be used as a warehouse for mining equipment spares as well as general storage. The building will be supported on a reinforced concrete raft foundation.

The compressor building will be located south form the portal access to the mine. The building will be a 15 m (long) x 10 m (wide) fabric building that will house the compressor to feed the mine operation. The building will be supported on a reinforced concrete raft foundation.

3.7.5 Ancillary Buildings (Vares Processing Plant)

Ancillary facilities at the Vares Processing Plant includes laboratory, reagents storage, tailings storage, administration building, concentrate storage areas, security, workshop/warehouse and laydown areas.

The laboratory will be an assortment of prefabricated, single-storey, modular buildings on precast concrete blocks, totalling 300 m^2 of area, and housing the equipment for typical site assays.

The administrative building is located at the Vares Process Plant site to the north of the site. This building was retained from the previous mining period and has been refurbished for purpose. The building contains administrative offices, and on-site environmental laboratory . The core storage is to be relocated to Vareš to make space for onsite canteen and ancillary facilities.

The workshop/warehouse building at the site will be a 15 m (wide) x 48 m (long) fabric building located west of the process plant. The building will be used to carry out repair work for the VPP and surrounding infrastructure and for spare parts storage. The maintenance bays will be serviced by a 25 t bridge crane, supported on steel framing independent of fabric building framing. The building will be supported on a reinforced concrete raft foundation.

The reagent storage building will be a 24 m (wide) x 36 m (long) fabric building located northwest of the process plant. The building will be supported on a reinforced concrete raft foundation.

The tailings storage building will be a 23 m (wide) x 35 m (long) fabric building located southwest of the process plant that will house the tailings filter press and storage space for tailings. The building will be supported on a reinforced concrete raft foundation.

The concentrate storage building will be a 21 m (wide) x 40 m (long) fabric building located west of the process plant that will house the concentrate filters, air services and storage space for concentrate produced and space for loading containers using conveyors. The building will be supported on a reinforced concrete raft foundation.

3.7.6 First Aid and Emergency Response

An emergency preparedness and response plan has been developed for the Project and is available as part of this ESIA package. Regarding emergency response, initially the response team in place for the nearby Breza coal mines will be used until a dedicated team in Vares is developed. Further, an agreement is in place with the local fire brigade and civil protection team.

First aid training will be provided to all operational staff, with a team of dedicated first aiders also present. First aid kits will be available at all working areas.

Eastern Mining are currently in discussion with a private health service provider regarding the development of a health clinic in Vares. The clinic will provide normal GP services as well as basic diagnostics including Pathology, CT and X-Ray. They will be able to provide first and second level trauma services via a dedicated high spec ambulance. The ambulance service will be able to provide transport to a larger hospital in Sarajevo, if required.

3.7.7 Security

A security coordinator will be directly employed by Adriatic Metals, with additional security officers contracted for the mine and process plant sites. Security at the explosives magazine will carry side arms, whilst all other security will be unarmed.

Security fencing will be installed around the VPP and the Rupice site, with gate houses, cameras and lighting also in place. Posts will be manned 24-hours.

3.7.8 Fire Safety

Adriatic Metals have an agreement in place with the local fire brigade and civil defence service in case of emergencies. Hydrants will be available at all critical locations across the Project site.

A fire water tank and pumps will be present at Rupice, adjacent to the portal entrance. Water collected through dewatering will be utilised as fire water. At VPP, the municipal supply that will provide the plant with the required water also has capacity and will be used as the fire water supply, providing 9l/second.

3.7.9 Resource Efficiency

Energy and resource efficiency has been built into the project design using the hierarchy of resource efficiency, namely eliminating demand where possible, reducing consumption, reusing and recycling materials and returning via treatment and reinstatement. Key large scale resource efficiency measures include the brownfield redevelopment of the VPP site and reusing site won materials and facilities (such as thickener tanks) where possible. This has a large effect on reducing consumption for building materials and additional land-take, enabling local utility and service lines to be improved and invested in (improving the resilience of municipal assets as well as simplifying the development process for the site) and minimising waste generation. Resource efficiency in this manner has been instrumental in the water supply selection for both the VPP and Rupice sites where the decision has been taken to employ, through refurbishment, the existing water utilities to supply the sites.

As well as brownfield regeneration for the processing plant, individual mine facilities have used the resource efficiency hierarchy in the following manner:

- Re-use of site won material, in particular acid neutralising limestone and dolomitic overburden to form pad bases and starter embankments for key assets including the ore, waste stockpiles and the TSF;
- Using a high water efficiency processing plant which produces dry tailings and recovers >80% of water, meaning the overall water make-up for processing is, on average, a modest 2.4 l/sec which is a high performance efficiency metric for a start-up operation of this scale;
- Reusing mine inflow water in the mine service water reticulation system;
- Minimising cut and fill balances for the waste and ore stockpile by designing a pad system which retains a 2˚ slope, which also has the added benefit of reducing contact time for runoff;
- Depositing tailings into the nearest suitable enclosing landform, minimising haulage requirements;
- Reusing wastes and tailings as paste backfill into underground void, minimising land-take and the need for additional site won material;
- A 32.4kWp roof-mounted solar PV array has been included at the VPP admin building. This is expected to save at least 20.6tCO_2e per year;

- Providing improved building fabrics for buildings to minimize heat losses as well as reducing noise impacts; and
- The use of modern, energy efficient electrical equipment and mobile plant with fuel-efficient engines.

3.8 Water Requirements and Management

3.8.1 Water Balance

The average water demand for the Rupice mining concession is estimated at 5.5 l/s (472 m^3/d) with a potential maximum water demand of 7.58 l/s (655.25 m^3/d). Steady state values for underground mine consumption, wash down, crushing, and potable water requirements have been used, as well as an estimate for paste backfill requirement throughout the LOM. Potable water demand is estimated at 24m^3/d. The average water demand for the Vareš Processing Plant is estimated at 5.4 l/s (466m^3/d). This value is based on a steady state assumption for process waters and non-technical water with a degree of uncertainty applied.

A provisional water balance has been undertaken for the Rupice Concession. The water supply source alternatives have been reviewed extensively. Consideration has been given to abstracting water from the Borovicki stream, the Vrući Potok stream ('Hot stream'), the Trstionica river a groundwater source, re-using inflowing mine-water and a number of these sources in conjunction. Although the water requirements for the Rupice project are not large and at times may only represent just over a few litres per second, the ephemeral nature of the hydrology in the catchments has made it difficult to confirm a reliable supply which leaves enough flow in-stream to meet minimum ecological requirements.

The option of a supply from a dam on the Vrući Potok required a supplementary supply provided by a storage pond on the Borovicki (in close proximity to PP-III). Sensitivity analysis was undertaken to determine periods of stress when inflows into the Vrući Potok dam would be less than water demand. The analysis indicated this would occur potentially about 20 days per year on an average basis. Given this potential unreliability, the supply source then considered a direct abstraction from the Trstionica river approximately 1.5km downstream from the Rupice site, into which the Vrući Potok flows. Ongoing hydrological analysis is being undertaken of this source. Early indications are that although the Trstionica river is expected to have more flow and a larger catchment area than the Vrući Potok, the year round and drought year flows may still not be reliable enough to satisfy demand. An additional factor is that both the Trstionica and Vrući Potok have regular high sediment loads with suspended sediment recorded often in excess of 10mg/l and on occasion reported at over 10,000mg/l (with increased associated metal concentrations).

Given these constraints in developing a nearby useable, dedicated raw water supply, the Rupice project is now progressing plans to rehabilitate an un-used water source that draws from the headwater springs of the Bukovica stream. This asset is owned by JKP Vares (the local water utility) and is located 5km east of the Rupice site. The Bukovica source has existing serviceable infrastructure

in the form of an intake and a pad for a pumping house and has been used historically but fallen into disrepair. The rehabilitation of the site, deployment of pumping equipment and pipeline to the site will be a contracted agreement with JKP who can guarantee supply. Additional capacity can be included in the pump and pipeline that may provide a means of reticulated potable water supply becoming available to the residents of Borovica as a community improvement project. The pipeline would follow the existing and haul road alignment and be buried in a side easement for approximately 3km with a spur running for approximately 2km through woodland to discharge to a header reservoir on the ridge above the Rupice site which is already present (approximately 150 m^3 capacity i.e. 8 hours supply storage). Further work will need to be conducted to identify the baseline of the Bukovica, in terms of hydrology and ecology. Work will take place over the coming months.
The Bukovica source was used to supply Vareš with water during the period from 1957 up to 1978. The source capacity ranges from a minimum of 6 l/s to a maximum of 9 l/s (the project demand is estimated to be an average of 5.4l/s). The water source is owned by JKP and was gazetted in the cadastral plan and survey report "FBIH Groundwater Drinking Cadastre" 2015), which includes a usage and water permit. A ‘catchment’ was built at the source facility and pumping station i.e. a platform structure and spring enclosure that provides a sanitary grille intake. Overflow from the ‘catchment’ outlet is used in a commercial fish farm 50m downstream of which the property is owned by JKP and leased to a private operator. Chemical analysis of the source works from 2015 indicates it has good quality water (eg low mineralisation, nitrate and ammonium concentrations) of a calcium bicarbonate water type representative of the natural springs / groundwater in the area.

There are also two project water pipelines that draw water from the Borovicki (the Sastavci tank) and the Vruci Potok (the K1-4 network) that will be retained. Currently these pump and pipeline systems are sized to provide a maximum of 4 l/s intermittently and 0.4 l/s continuously to provide service water exploration drilling activities.

Drinking water for personnel and high-grade water uses at the Rupice site will use the same source with additional potabilisation if necessary, on site. Where possible inflowing mine-water will be recycled to manage demand.

Graphical representations of the site water balances based on monthly time steps are presented in Figure 3.12 - Figure 3.15 below. Studies are ongoing and the final water balance and schematic may change slightly.

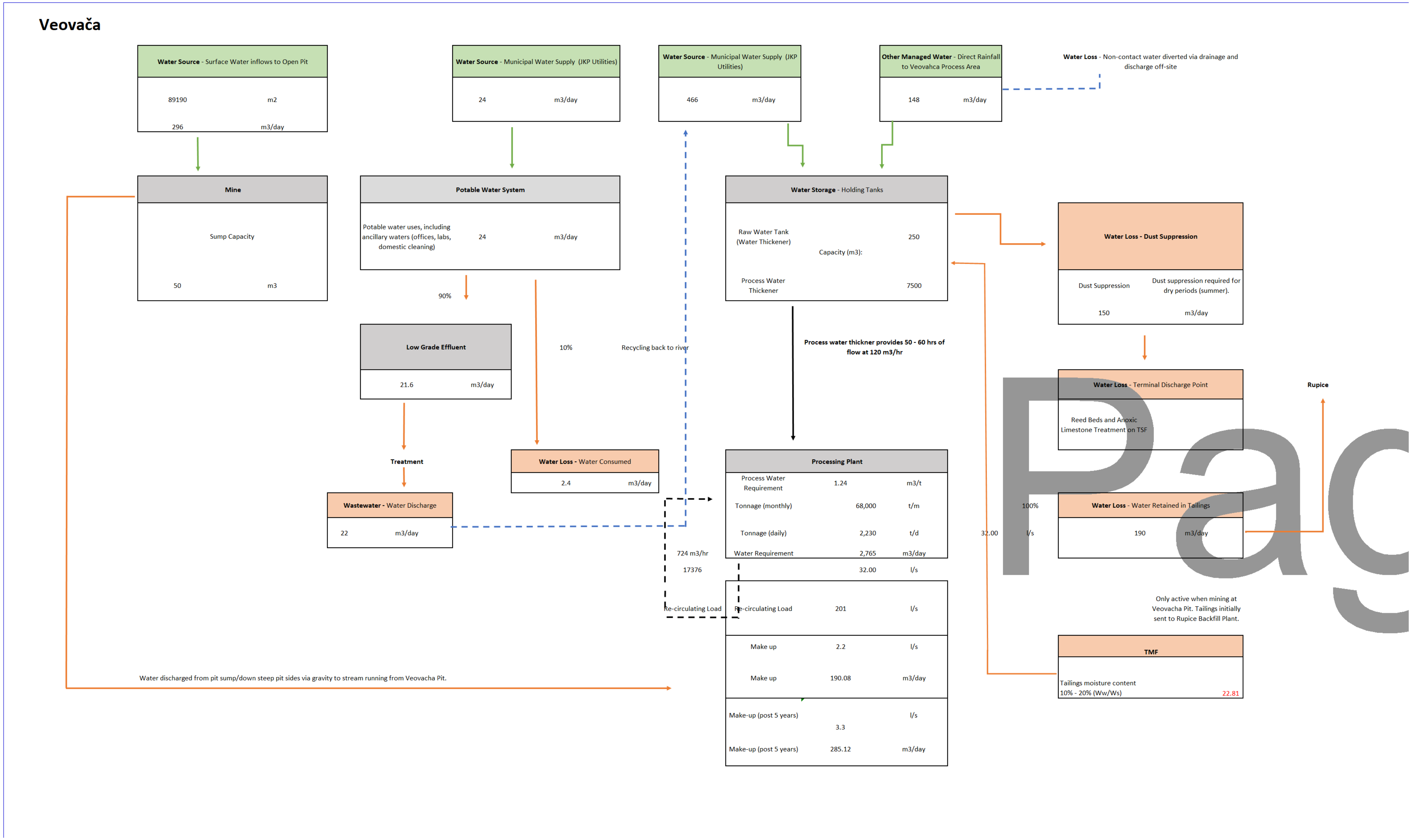

Figure 3.12: Vares Processing Plant Water Circuit (steady state average)

Rupice

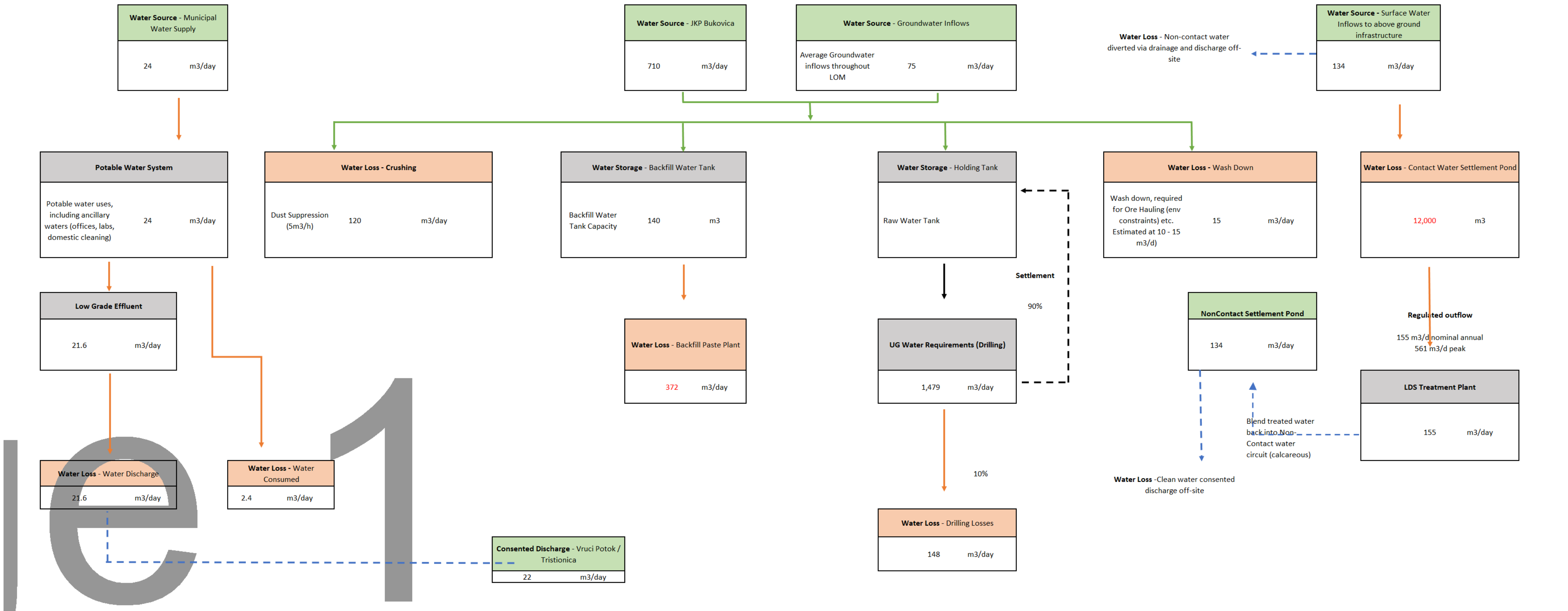

Figure 3.13: Rupice Water Circuit (steady state average)

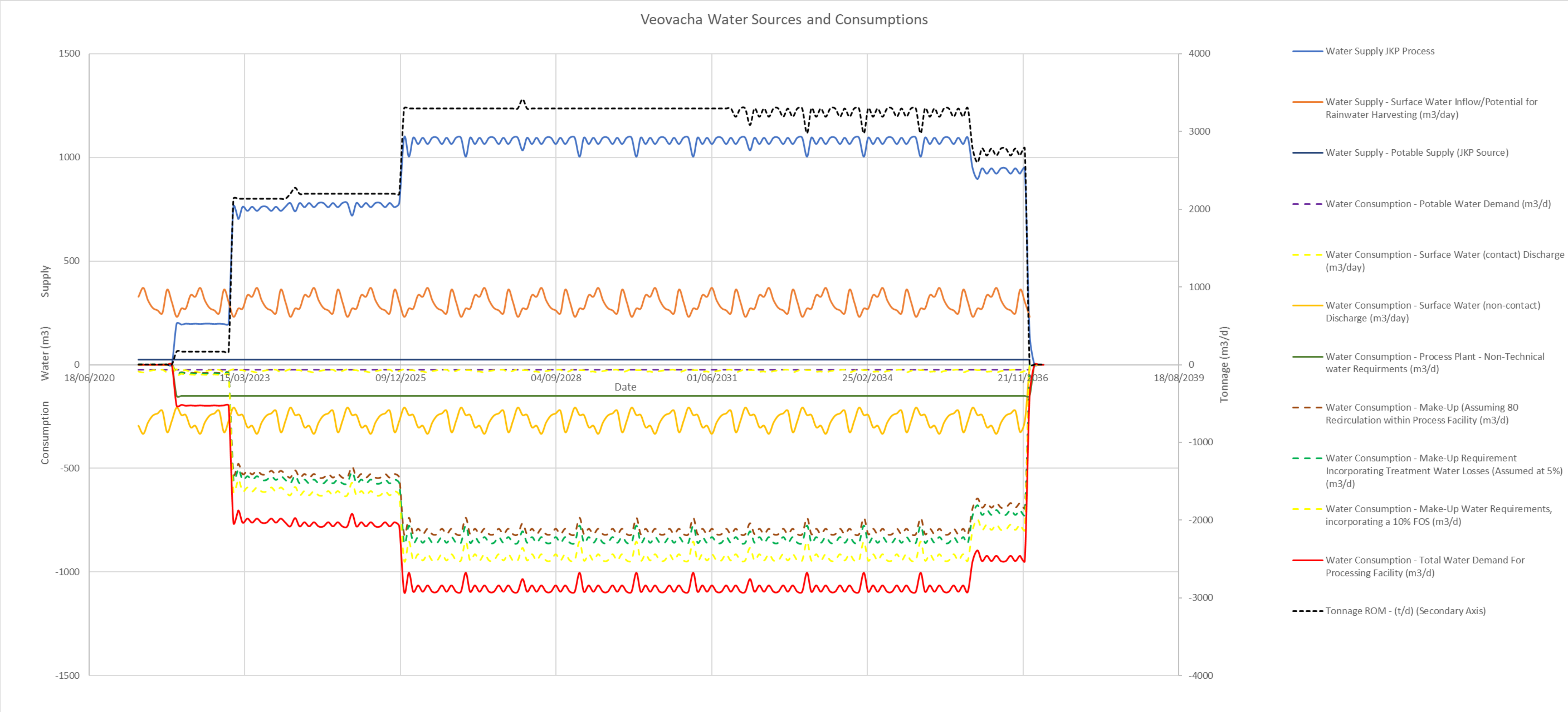

Figure 3.14: Vares Processing Plant Water Supply and Discharge Balance

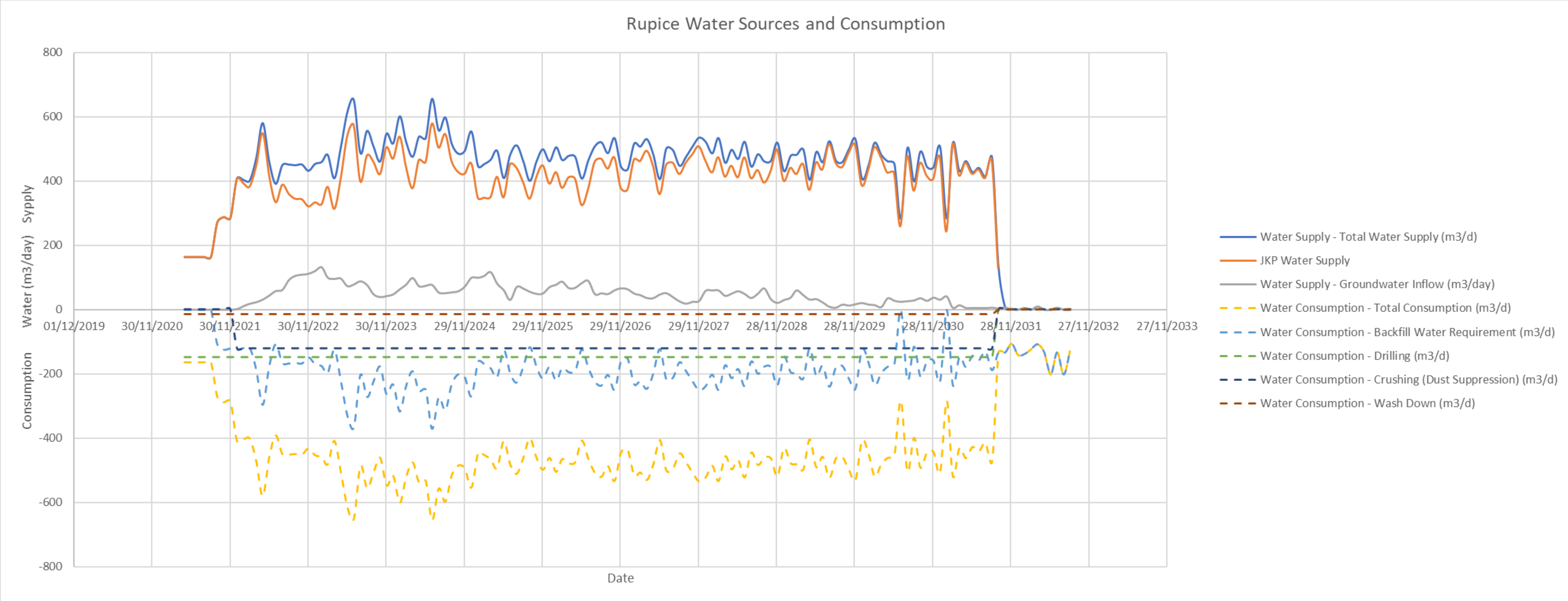

Figure 3.15: Rupice Supply and Discharge Balance (monthly)

3.8.2 Rupice

The flow requirement for water supply at Rupice is 5.5 l/s. An earlier review of water supply options (WAI, October 2020) considered the provision of storage reservoirs (Rupice 1 and Rupice 2) on the Vrući Potok Stream upstream of flow monitoring location PPV. These sources have proven to be problematic due to limited reliable year-round flows and high sediment and debris loads in the stream. Additional options of locating a storage reservoir or run-of-river abstraction further downstream on the Vrući Potok and on the Trstionica River have been considered.

The supply option at Rupice now being examined utilises the JKP water supply system on the Bukovica spring source: the 'Mrestilište Studeni potok', which has available yield in the range of 8 to 15 l/s. This source is partly commissioned already as there were earlier plans to develop a reticulated supply to some local small-scale enterprises and the settlements around Pogar. As such some three km of pipeline has already been built as well as an intake structure and pump station foundation.

The project will require a preliminary water permit, a water consent and a final consent issued by Vares Municipality. Permitting, consenting and final detailed project design will be provided by JKP who are licensed for this level of engineering.

3.8.3 Vares Processing Plant

At the Vares Processing Plant (VPP) the demand will be met by the existing JKP d.o.o. Vares[1] reticulated supply. The VPP site has its own dedicated receiving tank and pipeline supply which has been operating and providing water for the exploration team on-site since 2018 until the present. The water is provided by the JKP network of rural waterworks and springs and arrives on site at constant pressure and potable standard and the existing supply pipe is sized up to 9l/s. The expected water demand for the facility is 5.4 l/s. The water originates from the Lalića Mlin spring which has a reported capacity of between 6 to 15 l/s and which also supplies water to the neighbouring villages of Pržiće, Tisovici, Bijelo Broje, Mir and Stupni Do. The supply is part of a distribution network with overall excess capacity in the order of 40 to 60 l/s across the Vares municipality and individually in many villages. Additional water can therefore be redistributed and deployed where necessary (Vareš Municipality Development Strategy, 2017–2026). Stupni Do is connected to the Sedra spring source which is operated in conjunction with Crna vrela water supply, which is also reported to have excess capacity, yields in the range 6-15 l/s.

The project water demand at VPP is almost entirely consumptive i.e. a net negative water demand as water is used along with flotation reagents in the processing plant and continuously lost in entrained moisture content in concentrate product and tailings leaving the plant. The VPP water demand, including operational and unaccounted for losses is expected to be in the order of 5.4l/s which appears well within the network capacity. Water will be provided under licence or contract with JKP to ensure an assured reliable supply with minimal change to the existing utility footprint.

3.8.4 Site Drainage and Stormwater management

At Rupice, the surface infrastructure, mine portal, waste dumps and ROM stockpiles have been designed to drain through engineered channels and a settlement pond system prior to release (non-contact water) or treatment (contact water). All drainage from the mine will match the pre-project catchment conditions that drain to the Vrući Potok. The overall site perimeter will be bunded and bermed and no run-off from the flanks of the hillside should interact with the site apart from a central small depression that will either be culverted or comprise rock drain to isolate the occasional ephemeral overland flow expected during major thunderstorms. Non-contact water comprising uncontaminated runoff from impervious mine facilities will be collected via site drainage and retained in a sedimentation pond with nominally three-day duration rainfall retention capacity prior to the semi-clarified water being released to the Vrući Potok. Penstock arrangements will be in place to allow release of peak stormwater which would otherwise represent a flood risk. Water running off the waste rock stockpile and ROM stockpiles will be collected in a toe dam and treated prior to release. The waste rock and ROM stockpiles are both temporary given that the ROM will be transferred for processing and the waste rock is likely to be used for underground mine backfill.

The drainage design of the stockpiles is based on an assumed impervious liner with no sub-surface infiltration. The stockpiles are placed on an impermeable pad raised and bunded above natural ground elevation with an external Mechanically Stabilised Engineered (MSE) wall, engineered granular sub-base material and HDPE liner beneath graded locally site-won calcareous gravel dressing 150mm thick. The pad will have a 2˚ moderate fall / grade to the west limiting the potential for ponding and retention/reaction time whilst on the pad. Sub-base drainage and the collector system will comprise perforated and non-perforated drainage pipes embedded into the MSE wall and draining down to the second settlement pond located in the Hot Stream Valley near the lower portal entrance. The maximum size of the footprint of each of the facilities[3] has been used to determine drainage and effluent sizing.

The peak rainfall and flow at Rupice has been determined according to two design parameters:

1. The stockpiles are considered temporary facilities, some materials may only be present for a maximum of four years, therefore the design rainfall conditions relate to the 1 in 25 year, 24 hour storm event (per IFC guidelines).
2. The other site infrastructure is permanent, and the design rainfall conditions relate to the 1 in 100 year, 24 hour storm event (per IFC guidelines).

Annual average rainfall and flow rate has been determined to size other water infrastructure.

Many long-term rainfall statistics in Bosnia were destroyed in the civil war with limited resumption of a detailed national record. In order to obtain design rainfall statistics, a literature review and enquiries

[3] 240,000 tonnes High Grade Ore, 60,000 tonnes medium grade and 20,000 tonnes low grade plus a 750,000 tonne waste rock facility.

with the Federal Hydrometeorological Institute has been undertaken. Hydrological calculations, formula, catchment areas and maps are included in Appendix 2 of the project's Site-wide Water Management Plan, part of the project DFS.

Bosnia experienced a storm event in May 2014 that has been recognised as '*an extreme extraordinary event whose return period greatly exceeds 100 years*' (Vidmar, 2014)[4]. Rainfall statistics have been derived from this event and used in this study to calculate design rainfall parameters representing extreme conditions. Based on this, and comparing with other similar sites, the following design rainfall statistics have been adopted:

- 25 year 24 hour rainfall intensity: 70 mm
- 100 year 24 hour rainfall intensity: 100 mm

These are considered suitable for design purposes but may not be the maximum rainfall experienced and consideration will be given at the detailed design stage for additional provisions such as a 10% additional margin to account for climate change and other design factors.

As well as the aggregated quantity of rainfall falling in a 24 hour period, the distribution (or 'shape') of the storm event, i.e. how it grows and recedes has been modelled using the 'SCS' method of rainfall distribution[5]. The design storm events of 75mm and 100m for 25 and 100 year return periods (respectively) have been parameterised using this SCS method.

From this the peak rainfall intensity at hourly and sub-hourly time steps has been used to size appropriate drainage infrastructure incorporating the time of concentration i.e. the time taken for runoff to peak across the catchment (calculated using the *Kirpich* formula). Time to peak calculations (and *time of concentration*) were determined using site-specific values for slope and soil type assumed generally to be semi pervious rock for stockpiles and uncompacted sandy loam with a degree of infiltration (retention) for other areas. Time to peak ranges from 36 seconds for some of the smaller catchment areas such as individual ore stockpiles to approximately two and a half minutes for the whole area of the prepared stockpile pad. Therefore, clearly the peak instantaneous (sub-hourly) rainfall intensity is the most suitable to use for sizing to ensure infrastructure is not overwhelmed.

Estimates of flow rates (runoff) were calculated for each of the stockpile zones and the whole of site (using the *Rational* method) and are reported in the DFS and used to design the contact and non-contact water systems which are kept separate. Catch drains ('C' drains) that connect to natural outlets have been designed for non-contact water run-off. Slightly larger site drains for non-contact water ('D' drains) are designed to drain the made terraces which skirt the base of the MSE walls constructed on the site.

[4] Andrej Vidmar et al. The Bosna River floods in May 2014. Nat. Hazards Earth Syst. Sci., 16, 2235–2246, 2016 www.nat-hazards-earth-syst-sci.net/16/2235/2016/doi:10.5194/nhess-16-2235-2016

[5] United States Department of Agriculture (USDA) Soil Conservation Service (SCS) method of estimating rainfall excess from rainfall.

Runoff, except in the Ore Stockpile Area and Paste Plant area, is assumed to be natural runoff without potential for contamination. A sedimentation settling pond has been designed to provide 2500m^3 storage for run-off from the paste plant. The non-contact areas of the site such as the administration and warehousing areas are assumed suitable to dispose directly to the natural drainage courses which provide swale attenuation of sediment prior to exiting the site. Truck-shops and vehicle wash-bays and similar areas with known potential for accumulation of hazardous materials will have their own isolated, impervious sump drains and collector systems that will be regularly pumped out and managed as part of the site's liquid water inventory. A marked-up layout drawing showing the drainage lines, location of culverts, pond locations and outlet points where diverted or stored water is released is included below in Figure 3.11.

Contact water containing ARD leachates will be collected in a settling pond with retained storage capacity of 12,000m^3, located northwest (downstream) of the MSE stockpile pad wall. This provides sufficient storage for retention of the peak flow (design storm event) with additional capacity to account for antecedent water storage that may be in the pond. The detailed design stage will determine the pond partitions (for low and high grade ore effluents) and the dimensions of the emergency overspill.

The original settlement pond considered was located to the west of the ROM pad in the lower sections of a natural valley flowing southeast. However, upon review of this site it was apparent that the design would not be suitable as it would potentially disrupt natural flows, attract large catchment area inflow and velocities would be too high. Large elevation differences and long drainage flow lengths would require unnecessarily oversized ponds.

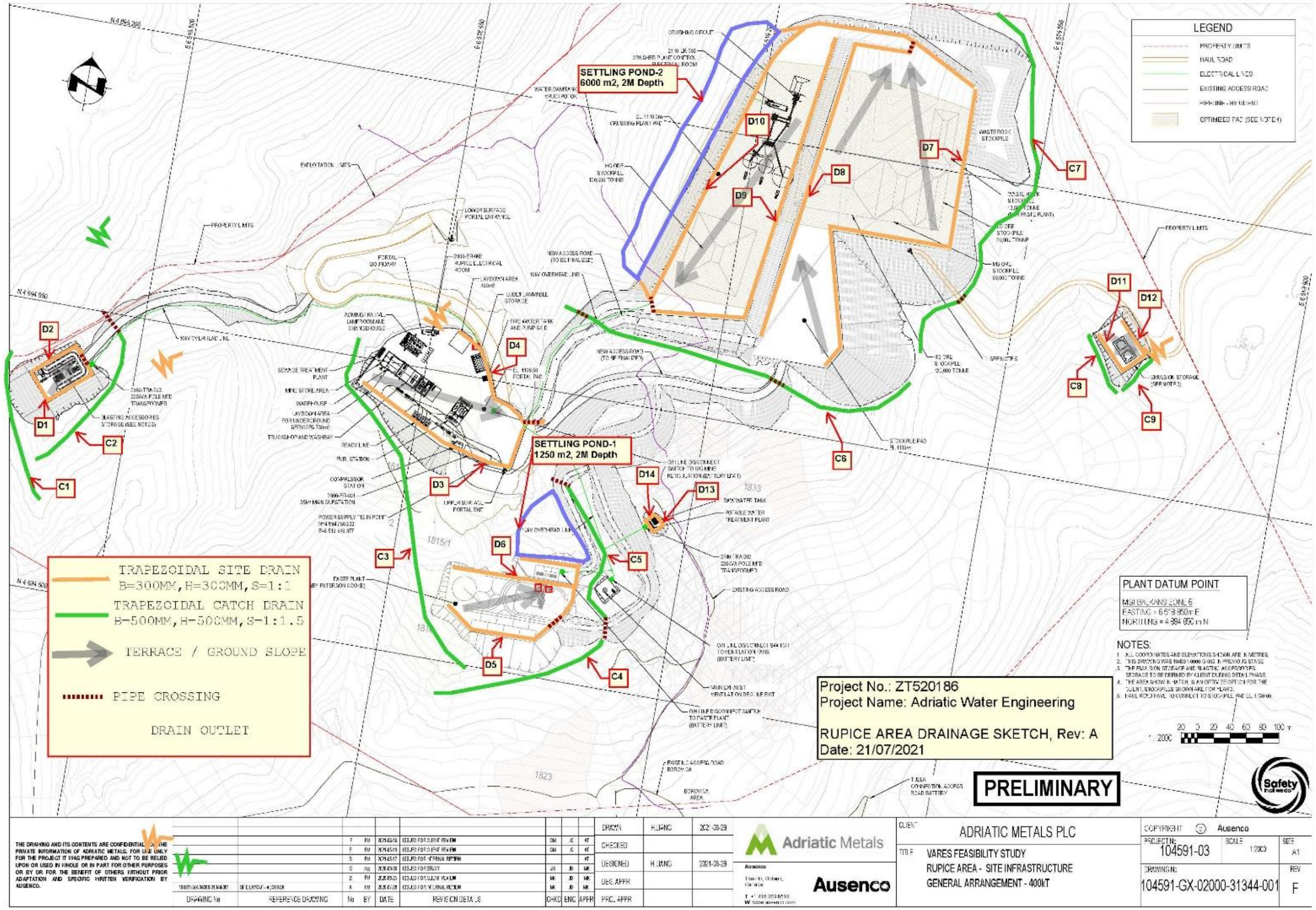

Figure 3.16: Rupice Site Drainage Elements

The VPP site elevation creates a ground surface fall away from the nearby Tisovici settlements. Stormwater and runoff is collected by onsite and perimeter drains feeding water to a pipeline that will run along the southwestern ridge above the drystack valley and discharges to the Mala river downstream of the TSF.

3.8.5 Water and Wastewater Treatment

Water provided by JKP d.o.o Vares is treated potable water and requires no treatment prior to use.

Potential Acid Rock Drainage and Metals Leaching (ARDML) from the waste rock and ore stockpiles will contain heavy metals such as iron, zinc, nickel, copper and cadmium. The effluent will not be suitable for dilution and direct discharge. The effluent will be collected in a partitioned toe dam which will segregate the highest acidity / metalliferous leachate from the ore from otherwise more moderate and buffered solution expected from the waste rock stockpile (which contains carbonate lithologies in the mineralised hanging wall and footwall units). Thereafter, a controlled blend of effluents will be conveyed through an active treatment plant using a Low Density Sludge (LDS) technology to adjust pH to circum-neutral level, reduce metal solubility and co-precipitate heavy metals with iron. A sludge waste stream will be produced.

The treatment plant will be sized for the expected Life of Mine ARD flux draining from the ROM and waste rock stockpiles. A toe dam and an additional emergency dam will be required to balance outflows. The treatment process needs to be optimised to the waste and ore schedule and residual composition following any neutralisation with site-won carbonate waste materials that may be used, if sufficient quantity is available in lining and barrier materials. Nonetheless an acidified, metalliferous ARD effluent stream is likely to be created from the Ore and Waste Rock Stockpile. Final treatment selection will depend on likely composition of manganese and dissolved iron, fortunately arsenic concentrations seem relatively low in the effluents. Sulphate removal may also be required. To ensure the discharge from the ore stockpiles and rock dumps achieves compliance, a number of processes are likely to be required including the active treatment system described and/or blending back treated water to mix and further neutralise and dilute with non-contact water prior to leaving site. As each process will form part of a treatment chain further modelling and process work will be developed under a treatment programme to confirm the optimum process.

3.8.6 Effluent

Although the Vares Process Plant will nominally operate as a zero-discharge facility, i.e. the metallurgical water balance is net negative, there will be occasions when reagent waters may need to be refreshed because the ionic concentration of the process water inventory will build up. Analysis (Libertas Metallurgy Ltd., July 2020) has indicated there does not appear to be any reasonable grounds to believe any treatment of the raw water or process water is required from a metallurgical perspective. The process water quality may however need management from reagent addition which results in significant input of calcium, sulfate, zinc and copper. The process designers have therefore recommended implementation of chemical antiscalant programs to inhibit the scale formation and reduce or eliminate operational issues. The locked cycle metallurgical tests have yielded results very similar to a previous test undertaken using fresh water, which suggest that the build-up of reagents will unlikely be a major issue in terms of contaminant concentration and process inhibition.

The continuous make-up requirement will replace all water "lost" with the tailings and the concentrate products so there will be continuous freshening and replenishment of the plant water. In case of a need to refresh or store larger volumes the operations can use surplus thickener tanks for storage pending an off-site disposal and treatment solution.

3.8.7 Sanitary Effluent

Based on the wastewater consumption factor of 0.9, for all ablutions, food preparation, cleaning and laundry activities, the expected waste-water discharges (grey and black water) from Rupice is calculated to be 21.6 m^3/d and from VPP to be 21.6 m^3/d.

Sanitary effluent from VPP will be discharged into the existing sewerage infrastructure operated by JKP.

Sanitary effluent from Rupice will require treatment using a package wastewater plant with associated sludge and odour management. A modular biological system such as MBBR is envisaged for operations. The sanitary effluent should be discharged downstream of the proposed water dam to avoid excessive bacteria and TOC build up in raw water. The design of the treatment plant will be finalised during the detailed design phase, in accordance with BiH and EU discharge limits.

3.9 Labour and Services

3.9.1 Workforce

The workforce requirements across the life of mine is presented in Table 3.14. Adriatic Metals have adopted a resourcing strategy within the strategic blueprint developed by Globe 24-7, Human Resources Consultants. The strategy states that with the exception of 10 roles for highly qualified technical specialists, all other employees will be FBiH nationals. (repeated below)

Eastern Mining have utilised local Institutes throughout the permitting, development and design of infrastructure, whilst local suppliers, manufacturers, fabricators and builders will be used to support project procurement and the supply chain. Construction, haulage and mining will be undertaken by contractors, yet to be determined. Contractors will go through a tendering process and key contractors will be required to develop Environmental and Social Management Systems, in line with EBRD requirements.

Table 3.14: Mine workforce requirements across Life of Mine			
Project Component	**Construction**	**Operations**	**Closure**
Total Rupice Complement	163	163	20
Vares Processing Plant	8	110	10
General and Administrative	37	48	24
TOTAL	**208**	**321**	**54**

3.9.2 Operational Hours

The underground operations will proceed with the calendar and shift arrangements as below:

- 365 Working days per year;
- 2 Working shifts per day;
- 11 Underground hours of shift duration; and
- 7.8 hrs Effective hours per shift

These estimations do not account for any unexpected closures that are out of the control of Eastern Mining that may arise.

The processing plant will operate on a similar shift arrangement to the mining operations. Management, administration, and technical services will operate on a 11-shift fortnight with leave allowance being covered by junior or supporting roles.

3.9.3 Recruitment and Training

Mining aim to hire as many people as possible locally, in line with the resourcing strategy and recruitment process (Figure 3.17), within the strategic blueprint. Ten expatriate roles will be provided for management, senior professionals and trainers. All other recruitment will be sourced from BiH, with location prioritised as follows:

1) Zenica-Doboj Canton
2) Sarajevo Canton
3) Tuzla Canton

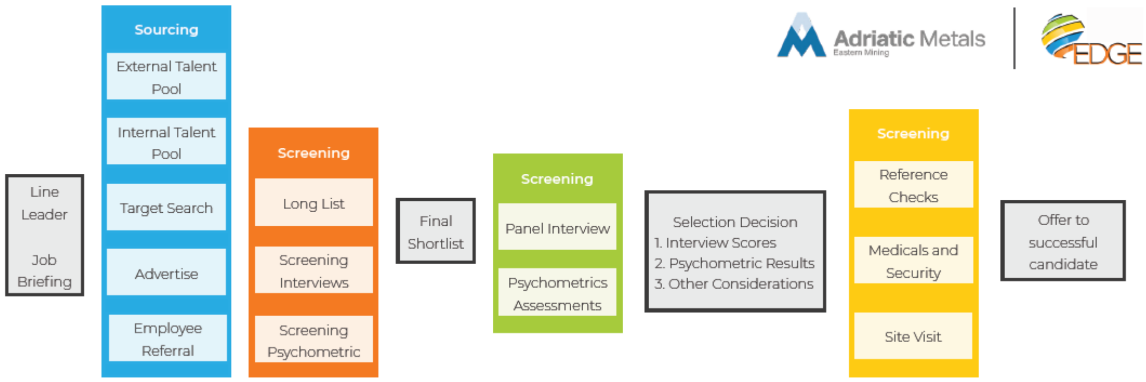

Figure 3.17: Recruitment Process, as per the strategic blueprint

Local job portals and advertising channels, such as Radio Bobovac and Radio Breza, will be used to ensure local recruitment is prioritised. The resourcing process will be clearly documented with supporting evidence for appointment decisions.

Specific training on underground exploitation will be provided at the Vares High School. This vocational programme will be available to existing and future high school students, as well as adults wishing to partake in night classes, as laid out in the strategic blueprint.

3.9.4 Housing and Accommodation

On-site accommodation will not form a part of the Vares Project, instead BiH employees will be either from Vareš and nearby towns, or encouraged to relocate to Vareš town, where sufficient vacant properties are available. The accommodation will consist of lodges, through an agreement with the hunting society, and holiday accommodation in addition to a list of municipality owned apartments in Vareš. Adriatic Metals will offer incentives to workers to encourage moving to Vareš with their families. Travel allowances will be discontinued to reduce the number of workers that reside outside of Vareš, and therefore reduce the use of public transport and cars, but alternative bus travel will be offered on key routes.

3.9.5 Transportation for Workers

A park and ride bus service will be implemented for travel to and from Rupice and VPP. One 50-seater bus per shift will depart from Zenica with any staff who reside there before heading to Kakanj and Breza. The drop off location will be the park and ride car park, located in Vareš, next to the newly constructed coreshed/geology office between the railhead at Droskavac and the bridge and road that lead to Tisovci. Additionally, a 20 seater bus will arrive at Vareš park and ride from Sarajevo each shift. Employees residing in Vareš will be required to make their own way to the park and ride. Public transport is available for employees residing in Tisovci to the Vareš park and ride.

Once the employees arrive at Vareš park and ride, Project owned buses will transport the employees to site, one bus will go to Rupice, and another to the VPP. Private car parking will not be allowed on site at VPP or Rupice.

APPENDIX 3.1 – TSF CROSS SECTION

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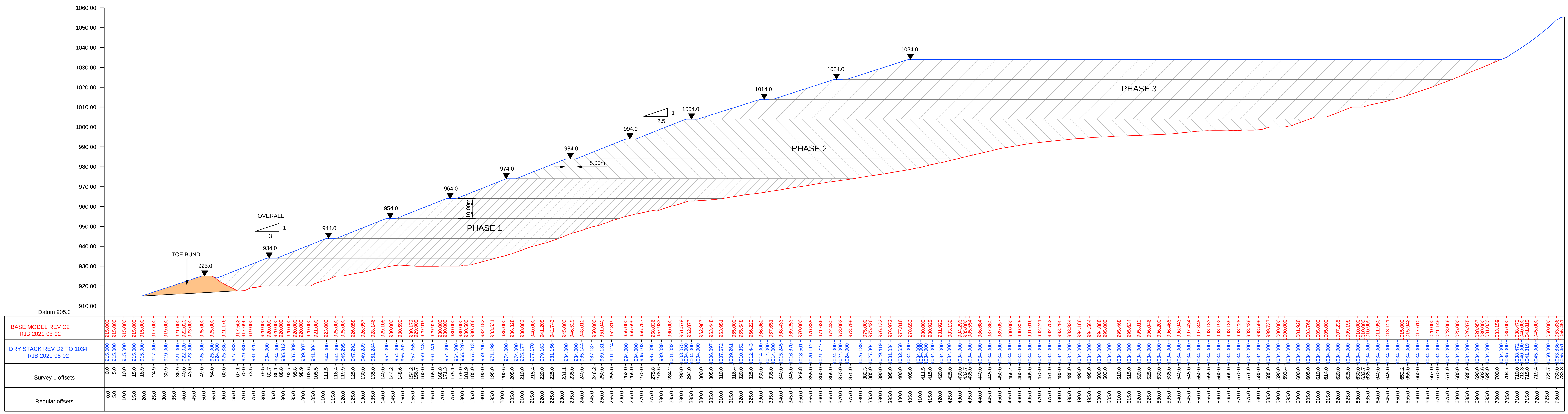

SECTION A - A'

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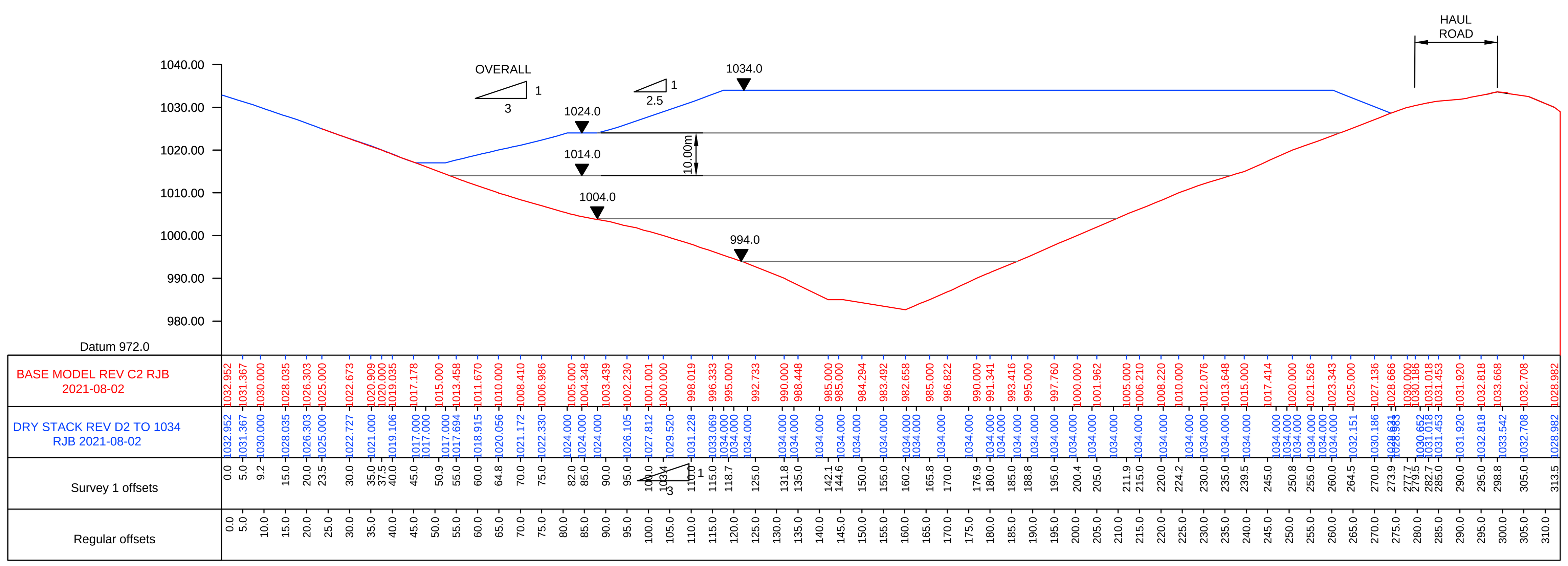

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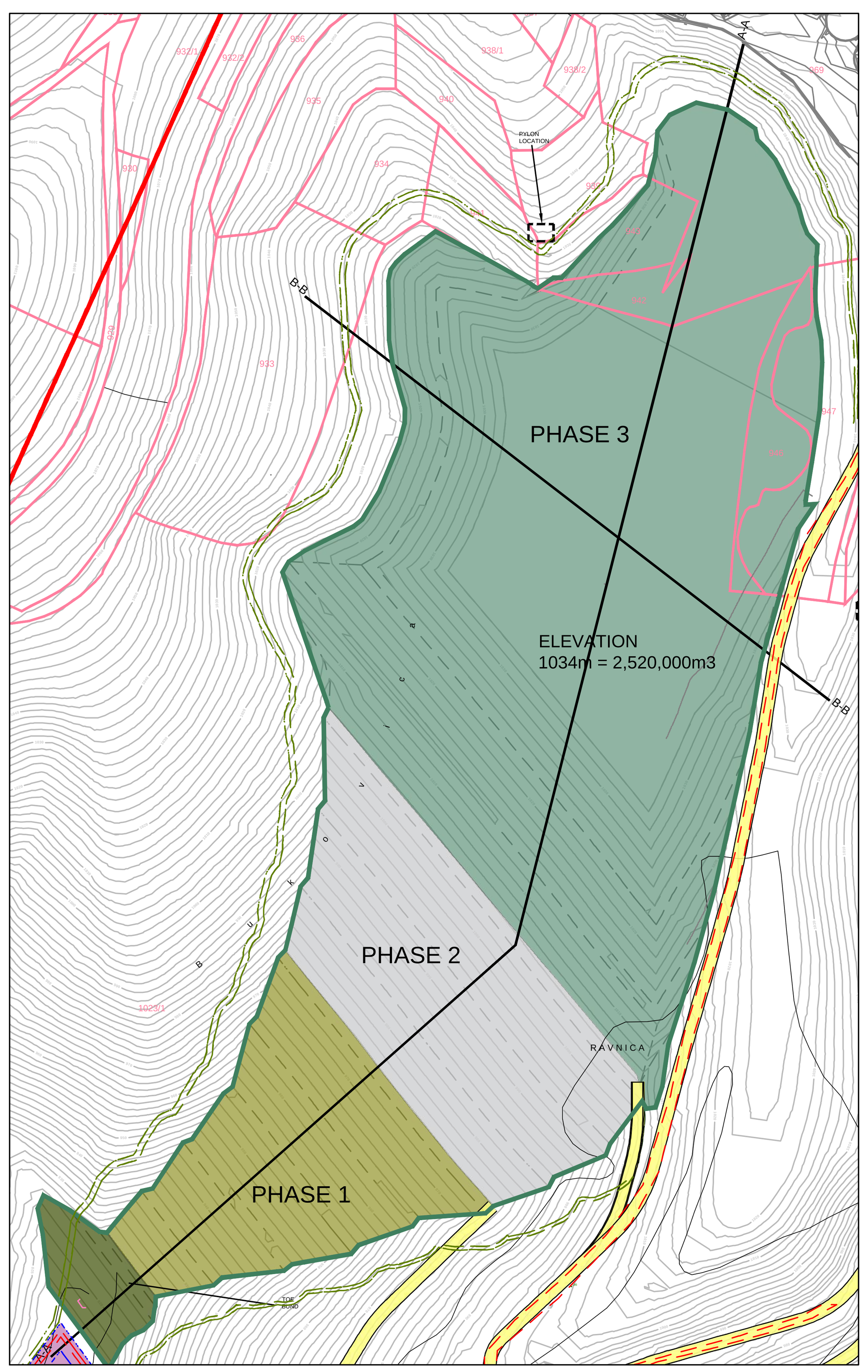

CROSS SECTION LOCATION PLAN

SCALE 1:2500

N:\ST\ST18587 - VARES TMF DESIGN\03 - DESIGN\AUTOCAD\ST18587-005-P2 INITIAL TSF DESIGN CROSS SECTIONS.DWG

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
P2	WIP				

CLIENT

ADRIATIC METAL PLC

PROJECT

VARES SILVER PROJECT
TMF FEASIBILITY DESIGN

DRAWING TITLE

CROSS SECTIONS
TSF REV D

DRG No.	REV
ST18587-005	P2

DRG SIZE	SCALE	DATE
A1	1:1000	04/08/21

DRAWN BY	CHECKED BY	APPROVED BY
SJB	NL	NL

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APPENDIX 3.2 – DESIGNERS RISK ASSESSMENT AND CLASSIFICATION FOR TSF

Appendix 3.2: Designers Risk Assessment and Classification for TSF

The Standards August 2020, assess the potential impact of a facility against several key areas to identify the potential risk and the potential consequence in the event that a failure occurred so that a Consequence Classification can be assigned. The higher the consequence classification the more stringent the required design parameters are.

Based on the Consequence Classification Matrix the TSF is considered to be a Low Risk Classification as there is no population at risk, no loss of life would occur, minimal short-term loss or deterioration of habitat or rare or endangered species would be effected, there would be minimal effects and disruption of business and livelihoods and no measurable effect on human health, no disruption of heritage, recreation community or cultural assets and there would be low economic losses and the failure area contains limited infrastructure or services. In the event that a failure occurs the tailings are highly unlikely to liquify and flow, as such the extent of the area potentially impacted is limited to the immediate area downstream of the stack and due to the historic waste dump at the mouth of the valley any tailings failure would predominately confirmed within the TSF valley.

The Designers Risk Assessment is summarised in Table 2 below. Each design item is assessed in terms of the probability of occurring and the consequence if it does occur to give an overall risk rating. The levels of consequence and probability of occurring are detailed below with the risk ratings summarised in Table 1:

Consequence:

1. Minor – minor level with limited damage or impact. These can generally can be mitigated by normal management processes and design combined with minor costs adjustments. < $400,000 US and minor repairs with no shut down or programme delay.
2. Moderate - moderate but measurable impact or damage. These can generally can be mitigated by normal management processes and design combined with minor costs adjustments. $400,000k to $2.5 Million US minor shut down or programme delay.
3. Serious - Risks that have a definite, significant, and measurable impact on economics, environment, social or project programme and design. $2.5–10 Million US, shut down or significant programme delays.
4. Major – sever and wide spread impact with a definite measurable impact on economics, programme or design. $10-20 Million US prolonged shut down or extensive programme delays.
5. Critical - risks that are largely uncontrollable, unpredictable, unusual, or are considered not to be typical. Good technical practices and quality planning are no guarantee of successful mitigation. These risks can have a major impact on the economics of the project including significant disruption of schedule, significant cost increases, and degradation of physical performance, loss of life and prolonged environmental impact>$20 Million US, complete shut down or stop of programme.

Probability of occurrence

1. Rare – The risk is very unlikely to occur.
2. Unlikely – The risk is more likely not to occur than occur.
3. Possible – There is an increased probability that the risk will occur.
4. Likely – The risk is likely to occur.
5. Almost Certain – The risk is expected to occur.

Table 1 Risk Rating

Risk Rating	
Extreme Risks that significantly exceed the risk acceptance threshold and need urgent and immediate attention.	15 – 25
High Risks that exceed the risk acceptance threshold and require proactive management.	8 – 12
Medium Risks that lie on the risk acceptance threshold and require active monitoring.	4 - 6
Low Risks that are below the risk acceptance threshold and do not require active management.	1 - 3

Table 2 Designers Risk Assessment (TSF)

Issue	Probability	Consequence	Rating	Mitigation	Revised Probability	Revised Consequence	Revised Risk Rating
Social impacts - displacement of landowners, significant visual impact, nuisance from dust and noise during construction and operation.	3	3	9	Selected site has no residential dwelling and no development downstream. Compensation negotiations ongoing with landowners at northern end of site, TSF foot print designed to omit excluded land areas. Visual and noise impact assessment to be undertaken as part of ESIA. The design of the containment facility itself takes into account the risk of extreme events and adopts a low risk approach.	1	2	2
Sensitive ecological features within site with loss of habitat and flora.	3	5	15	Site is dominated by commercial forestry, inspection during ESAI did not identify any flora or fauna of concern. Closure and revegetation of TSF will encourage native species within valley.	1	2	2
Embankment failure resulting in circular or non-circular shear slip surfaces with tailing release into surrounding environment and water courses	3	5	15	TSF slope profile is conservative to increase overall stability. Containment bunds to assist with slope stability. Deposition methodology to achieve 85% maximum dry density of compacted tailings thereby increased slope stability. Progressive restoration to prevent erosion and water infiltration. Site surface water managed by perimeter bunds to minimise surface water collection within the facility. TSF valley confined entrance restricting movement of any slip material in event slope instability occurred	1	5	5
Liquefaction of tailings during seismic event resulting in tailings breach	3	5	15	Tailings placed at optimum moisture content to achieve 85% dry density, and good surface water management including during periods of snow and ice formation will reduce potential for liquification.	1	5	5
Bearing capacity failure of foundation strata with settlement and slope instability in tailings.	3	5	15	TSF substrata characterised by weathered limestone classified as strong to very strong. Bearing capacity of weathered rock is not exceeded by TSF loading.	1	5	5

Issue	Probability	Consequence	Rating	Mitigation	Revised Probability	Revised Consequence	Revised Risk Rating
				Embankment foot print excavated to rockhead to remove superficial strata.			
Erosion and transportation of tailings during storm event.	5	5	25	Tailings placed, compacted and graded to from required profile to minimise erosion, run off and re-saturation of tailings. Progressive capping and restoration of each lift will minimise tailings exposed and therefore erosion.	1	2	2
Overtopping of contact water collection pond	3	3	9	The contact water collection pond has been engineered for a 1 in 10,000 year storm event which exceeds operational requirement of 1 in 200 year storm event.	1	3	3
Acid rock and metal leaching from tailings	5	3	15	Compaction of the tailings will reduce the permeability of the material significantly and progressive capping and restoration will reduce area of exposed tailings and infiltration potential.	2	3	6
Rockfall within TSF valley during construction or operations with potential injury or loss of operators life.	2	5	10	Valley is densely forested with no signs of previous rock fall. Strata in valley characterised by thin soils overlying competent rock. TSF developed in phases with tree clearance only occurring in 5m buffer around phase. Operating manual requires routine inspection of adjacent slopes.	2	2	4
The materials needed for construction cannot be sourced from site or are unavailable when needed for cell formation.	3	5	15	Large waste rock tips located within Veovaca open pit identified as potential source material for construction. Impoundment area preparation will provide significant amounts of topsoil and organic matter for soil improvement during restoration. Construction of haul road material types confirmed as suitable in specific areas.	2	3	6
Cost of project escalates because of unforeseen ground conditions or preliminary estimates of quantities are inaccurate	3	5	15	The overall facility design is simple and conservative, 3 costed tenders will be obtained.	1	3	3
The geotechnical characteristics of the tailings vary from those assumed for the design, slope angles not achievable and possible insufficient storage capacity if dry density not achieved	2	5	10	Facility currently has excess storage capability and room for additional lifts if addition storage is required. On going material testing during operations to confirm tailings characteristic will enable contingency measures to be implemented if required.	3	2	6