

# **PRELIMINARY SITE INVESTIGATION HUNTLY EAST MINE AND FARM**

**PREPARED FOR:  
KIMIHIA LAKES  
COMMUNITY CHARITABLE  
TRUST**

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## **CSI**


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<b>PSI REPORT: Huntly East Mine and Farm</b>	
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## 0.0 Executive Summary

<b>Purpose</b>	Undertake a PSI for 239 East Mine Road, 96 Tawa Road, 0 Kimihia Road and 191 Kimihia Road, Huntly.
<b>Current and Proposed Site Status</b>	Lake and surrounds, vacant land; pastoral land; bush and wetland. Fill the mine pit with water to create a lake with the immediate surrounds to become a recreation facility with accommodation and the pastoral land to become industrial, recreational and rural residential landuses.
<b>History</b>	Opencast coal mine from 1950 to 1974 with at least three motor vehicle workshops and a possible service station. Underground mine with a coal yard, railway yard and line, motor vehicle workshop and service station from 1978 to 2015. Pastoral land from at least 1941 to the present.
<b>Geology Hydrogeology Hydrology</b>	The soil at the site is clay or silt clay. A shallow groundwater system may be present beneath the site. A lake, streams and wetlands are located on site
<b>Site Investigation</b>	<p><b>Walkover</b> Undertaken by Guy Sowry on 26 August 2020. No current HAIL noted and no significant area of ground staining noted on the areas of historic workshop or service station activities.</p> <p><b>Potential HAIL and Potential Ground Contaminants</b></p> <ul style="list-style-type: none"> <li>▪ E5 - coal yard. PAH's, boron and arsenic;</li> <li>▪ E7 - mining industries. PAH's, boron and arsenic;</li> <li>▪ F4 - motor vehicle workshop. PAH's and metals;</li> <li>▪ F7 - service station. PAH's;</li> <li>▪ E1 - asbestos disposal. Asbestos; and</li> <li>▪ H - adjacent HAIL. Lead form a gun club.</li> </ul> <p><b>Conceptual Site Model</b> A <b>medium</b> risk to human health from potential contaminants associated with the coal yard and historical workshops and <b>medium</b> risk to the environment from potential contaminants associated with the historical pit workshop and gun club. A <b>low</b> risk to human health from mining, service station, asbestos disposal and gun club as either or all of: limited contact; restricted access and use; covered with vegetation; and some of these areas will be inundated by the lake.</p>
<b>Risk Assessment</b>	<p>A <b>LOW</b> risk to development and maintenance workers as PAH's more than likely degraded or at concentrations below NES SGV's and metal concentrations considered to be below NES industrial SGV's. A <b>LOW</b> risk to the environment as lead was not elevated during water quality sampling by WRC staff in 2018.</p> <p>Therefore, it is highly unlikely that there will be a risk to human health or the environment if the site is developed into the intended landuses.</p>
<b>Recommendations</b>	1. That no further contaminated land investigations are required.
<b><i>This sheet is intended to provide a summary only of the assessment study of the site. This sheet does not provide a definitive scientific analysis.</i></b>	

## 1.0 INTRODUCTION

- 1.1 Contaminated Site Investigations (CSI) has been appointed by Kimihia Lakes Community Charitable Trust (KLCCT) to undertake a Preliminary Site Investigation (PSI) of 239 East Mine Road, 96 Tawa Road, 0 Kimihia Road and parts of 191 Kimihia Road, Huntly (hereafter referred to as the Site). A PSI was requested by Waikato District Council (WDC) as the following Hazardous Activity or Industry (HAIL) has occurred at the site:
- E7 – mining industries.
- 1.2 The aim of the PSI is to provide KLCT with an evaluation of ground conditions to determine if any HAIL has occurred at the site and if yes:
- the potential risk to human health; and
  - the potential risk to the environment.
- 1.3 The PSI has been completed in general accordance with: the Resource Management Act 1991 (RMA) and the Resource Management Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011(NES).
- 1.4 This report is based on a review of aerial photos, oblique photos, business directories, consultation and a site walkover. The report has been prepared by Guy Sowry in accordance with the NES and in particular the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines (CLMG) No 1 - Reporting on Contaminated Land*.
- 1.5 As per the NES User Guide Suitably Qualified and Experienced Practitioner requirements Guy Sowry holds a postgraduate diploma in 'Environmental Health Science' and over 20 years experience investigating and reporting on contaminated land.
- 1.6 The following limitation should be noted:
- the investigation is only a preliminary investigation with no soil samples. Should a risk to human health be proven a detailed site investigation shall be required.
- 1.7 Attention is drawn to the report conditions shown in Appendix A.

## 2.0 CURRENT SITE LAND STATUS

### 2.1 Site Identification

- 2.1.1 The site is situated on the northeastern outskirts of Huntly township as shown in Figure 1.
- 2.1.2 The site is comprised of five separate sites with the details of each site provided for in Table 1: Site Details.

**Table 1: Site Details**

ADDRESS	VRN	LEGAL DESCRIPTION	SIZE
239 East Mine Road	04401/236/11	Lot 1 DPS 20619 Sec 3 SO 482553	89.6 ha
96 Tawa Road	04401/230/00	Allot 746 Taupiri Parish	21.8 ha
0 Kimihia Road	04401/232/00	Allot 857 Taupiri Parish Blk X11 Rangiriri SD	24.1 ha
191 Kimihia Road	04401/227/00	Allot 23A Sec 463 Taupiri Parish	5.1 ha
		Pt Allot 777 Taupiri Parish	2.1 ha
		Lot 21 DP 347582	3.2 ha
		Pt Allot 515 Taupiri Parish	0.7 ha
		Pt Lot 20 DP 347582	0.7 ha
		Allot 740 Taupiri Parish	3.8 ha

- 2.1.3 All of the sub sites are irregular in shape with the total size of the site considered to be approximately 102 ha comprised of: 43 ha - 239 East Mine Road; 21.8 ha 96 Tawa Road; 22 ha - 0 Kimihia Road; and 16.5 ha - 191 Kimihia Road.
- 2.1.4 All of the sub sites are zoned in the Operative District Plan as 'Rural' with the exception of the southern part of 191 Kimihia Road which, is zoned 'Residential'.

### 2.2 Site Description

#### 239 East Mine Road

- 2.2.1 The 239 East Mine Road site (the Colliery) is the coal mine, colliery and surrounding land as documented in Figure 2. The site does not include the electrical substation in the south as this is leased by WEL Energy.
- 2.2.2 The site is comprised of the lake and pit, pastoral land in the west and parts of the north, with the remainder of the site a mix of vacant grassed or vegetated land. East Mine Road enters the site in the south western corner. The only structures present with the exception of farm fences, are a corrugated iron shed (ex weighbridge station building) at the termination of East Mine Road and a number of smaller sheds in the same area.

- 2.2.3 The western boundary is fenced with a post, wire and batten farm fence with McVie Road immediately beyond. Further beyond is pastoral land and the Huntly Recycle and Refuse Transfer Station. The northern boundary of the site is fenced with a post, wire and batten farm fence with McVie Road immediately beyond. Further beyond is the Huntly Speedway and the Waikato Expressway Huntly Section Project Office. The eastern boundary is either fenced with a post, wire and batten farm fence or open to the site. Immediately beyond is vacant heavily vegetated land except in the northeast, which are contractors yards associated with Waikato Expressway Huntly Section. The southern boundary is either fenced with a post, wire and batten farm fence or open to the site. Immediately beyond in the central south and southwest is pastoral land with residential properties further beyond. Immediately beyond in the central south and southeast is the site.
- 2.2.4 The topography of the site is a mixture of: a steep slope down to the coal pit floor; flat land in the south and central east; and undulating land in the north.

### 96 Tawa Road

- 2.2.5 The 96 Tawa Road site (Tawa Site) is located to the east and south of the Mine Site and is a mix of vacant land, pastoral land and historical mine workings. A number of dirt roads are also present. Refer Figure 3.
- 2.2.6 Heavily vegetated vacant land is present in the south, central south and central north. Pastoral land with sparse vegetation is present in the centre. A small lake surrounded by vacant vegetated land is present in the north. With the exception of post, wire and batten farm fences the only other structures present are a corrugated iron shed in the centre and a wooden circle in the central east. A dirt road is present along parts of the western boundary and dirt roads crisscross the central north with one of these dissecting the site.
- 2.2.7 The site is open to the site in the west, central and southeast and south. In the north the site is fenced with a post, wire and batten farm fence with a contractors yards associated with Waikato Expressway Huntly Section immediately beyond. In the northeast the site is fenced with a post, wire and batten farm fence with pastoral land immediately beyond.
- 2.2.8 The topography of the site is undulating.

### 0 Kimihia Road

- 2.2.7 The 0 Kimihia Road site (Kimihia East Site) is located to the east of the Mine Site and is a mixture of pastoral land and vegetation/bush as documented in Figure 4. The site excludes the northeastern corner which, is the Waikato Expressway Huntly Section.
- 2.2.8 Pastoral land with pockets of vegetation is present in both the south and north. The centre of the site is heavily vegetated. A small amount of pastoral land is also present. Apart from a small shed in the central west no other structures are present other than post, wire and batten farm fences and concrete water troughs.



- 2.2.9 The site is open to the site in the west and southwest. The northern boundary is fenced with a post, wire and batten farm fence with pastoral land immediately beyond. The eastern boundary is fenced with a post, wire and batten farm fence. Immediately beyond is pastoral land with the Waikato Expressway Huntly Section further beyond. The central southern boundary is fenced with a post, wire and batten farm fence. Immediately beyond is Kimihia Road.
- 2.2.10 The topography of the site is undulating.

### **191 Kimihia Road**

- 2.2.11 The 191 Kimihia Road site (**Kimihia West Site**) is located to the south of the Mine Site and west of Kimihia East Site and is a mixture of pastoral land and vegetation/bush as documented in Figure 5.
- 2.2.12 The site is pastoral land with pockets of bush east of Tawa Road, pastoral in the centre immediately west of Tawa Road and bush in the west with pockets of pastoral. No structures are present other than post, wire and batten farm fences.
- 2.2.13 The northern boundary is fenced with a post, wire and batten farm fence with the site beyond. The western boundary is open to the Kimihia East site. The western section of the southern boundary is fenced with a post, wire and batten farm fence with Kimihia Road immediately beyond. The central section of the southern boundary is fenced with a post, wire and batten farm fence with Tawa Road immediately beyond except for a small area which is pastoral in the central north. The eastern section of the southern boundary is fenced with a post, wire and batten farm fence with bush land immediately beyond. The eastern boundary is fenced with a post, wire and batten farm fence with bush immediately beyond.
- 2.2.14 The topography of the site is undulating.

## **2.3 Surrounding Environment**

- 2.3.1 The site is situated in an area typified by industrial, recreational, residential, educational, pastoral and bush reserve.
- 2.3.2 Immediately to the north and north east of the site is the Fulton Hogan depot associated with the ongoing construction and maintenance of the Waikato Expressway. Further north beyond McVie Road is associated office accommodation. Also to the north beyond McVie Road is the Huntly Speedway. West of McVie Road is the Rotongaro-Huntly Pony Club, bush reserve, pastoral land and WDC Waste Transfer Station
- 2.3.3 To south west of the site are residential properties and Kimihia Primary School. To the south is rural residential properties and pastoral land. To the east is Kimihia Road with pastoral land beyond.

## 2.4 Proposed Development

- 2.4.1 The intention is to fill the historical mine pit with water to create New Kimihia Lake with the surrounds a community hub and thereby providing Huntly and New Zealand a world class recreational and educational facility.
- 2.4.2 The flat land in the central south and east of the Colliery Site and part of the Tawa Site is to include a boat ramp, trailer park and car park etc; an aquatic hire centre; a community central hub comprising a café and an education centre; short term accommodation comprising a hotel, dormitories and a camping ground; a destination playground; a coal field museum; and recreational reserve also comprising beaches and grassland etc. Refer Figure Six.
- 2.4.3 The farm land (Tawa Site, Kimihia East and Kimihia West) is to remain predominately as pastoral land but will also include: a wetland restoration area; a mountain bike zone; a sustainable energy solar farm; a plant nursery which will include commercial sales; and a mountain bike track. Refer Figure Six.

### 3.0 HISTORICAL REVIEW

#### 3.1 Aerial Photos

3.1.1 Reproductions of aerial photos are included in this report as SK01 (1943) to SK10 (2008) and are located in Appendix B.

##### 3.1.2 Colliery

3.1.2.1 The 1941 reproduction (SK01) shows the majority of the site as a lake. A small part is pastoral land with no structures present.

3.1.2.2 The 1963 reproduction (SK02) shows the majority of the site as an open cast mine with numerous structures visible within the mine workings. The remainder of the site is either vacant exposed land or vacant vegetated land. A series of buildings are present in the southeast outside of the workings. Roads are present throughout the site with the entrance in the south west. A stream is present in the southwest and central south.

3.1.2.3 The 1966 reproduction (SK03) shows similar conditions to the 1963 reproduction. A strip of vegetation is present in the west and north of the pit.

3.1.2.4 The 1969 reproduction (SK04) is considered to show very similar conditions to the 1963 and 1966 reproductions.

3.1.2.5 The 1973 reproduction (SK05) shows similar conditions to the 1969 reproduction. A small amount of water ponding is visible in the pit in the south and north. The strip of vegetation to the west and north of the pit appears to have increased in size.

3.1.2.6 The 1979 reproduction (SK06) shows similar conditions to the previous reproduction. The building's in the southeast have been removed and replaced with at least two structures and a new conveyor descending into the pit workings in the west. Railway lines/yards appear to be and present in the southwest associated with the conveyor. A number of new buildings are present in the central southwest on the margins of the pit workings. Roads are present around these structures. Water ponding is present along the entire bottom of the pit.

3.1.2.7 The 1984 reproduction (SK07) shows that the overall workings of the pit have decreased in size, as excavations are no longer present in the north east and east. Water ponding is present in the centre of the pit. Railway lines and yards with open rail cars are clearly present in the southwest. One line terminates in the northeast. The land to the north and west of the pit appears to be pastoral.

3.1.2.8 The 1991 reproduction (SK08) shows similar conditions to the 1984 reproduction. Water ponding is present over the entire floor of the pit commencing to the north of the working pit. A small area of excavation is present in the northeast.

- 3.1.2.9 The 1995 reproduction (SK09) shows similar conditions to the 1984 reproduction. Water ponding is present over the entire floor of the pit. The number of structures visible in the working pit around the conveyor has increased.
- 3.1.2.10 The 2008 reproduction (SK10) shows similar conditions to the 1984 reproduction. Coal is clearly visible at the bottom of the pit around the conveyor and at the top of the pit around the conveyor.
- 3.1.2.11 The 2016 reproduction (SK11) shows similar conditions to the 2004 reproduction. Water ponding is also visible in the northeast.
- 3.1.2.12 The 2019 reproduction (SK12) shows all buildings removed from the site except for a building in the central east. However, all the concrete pads associated with the buildings and other mining activities remain. The railway line in the south and east of the site has also been removed. Coal remains are still visible in the east of the site. The water level in the pit has risen and in the smaller pit in the northeast. The amount of vegetation around the pit in the west, north and east has increased. Bare land is present in the east and north east. The amount of vegetation to the south of the road in the south has also increased.

### 3.1.3 Tawa Site

- 3.1.3.1 The 1941 reproduction (SK01) shows the site as pastoral land except for the southwestern corner, which is heavily vegetated. A road is visible along the northern boundary except where it dissects the central north. In this area adjacent to Lake Kimihia is a dwelling and garage. Slightly to the south are probable farm sheds. To the south of the road, in the south and centre are probable farm sheds. A series of building's are present in the central north, along the road, with the footprint resembling a dwelling, garage and sheds. The majority of the southern, eastern and northern boundaries appear to be fenced.
- 3.1.3.2 The 1963 reproduction (SK02) shows the site as a mixture of mining, excavations, residential, pastoral, and vacant vegetated land. A road is visible along the northern boundary except where it dissects the central north. A road is also present in the west where it dissects the site; north to south. In the central north is a conveyor and buildings to the south and further east next to the road. Also present in this area is a grove of trees. Excavations are present in the southwest and northwest. A residential village comprising seven dwellings with curtilage is present in the centre. A shed is present immediately to the west of the village and a small circular object is present to the south immediately adjacent to the southern boundary. Pastoral land is present immediately to the east, south and west of this village, in the north and in the west and southwest with the reminder of the site vacant vegetated land. At least three sheds are visible in the small strip of pastoral land in the north.

- 3.1.3.3 The 1966 reproduction (SK03) shows similar conditions to the 1963 reproduction. The grove of trees in the central north has increased in size. A small pond is visible in the south west adjacent to both boundaries.
- 3.1.3.4 The 1969 reproduction (SK04) is considered to show very similar conditions to the 1963 and 1966 reproductions.
- 3.1.3.5 The 1973 reproduction (SK05) shows similar conditions to the 1969 reproduction. Most of the pastoral land is vegetated. The excavation in the northeast appears to be no longer present and the excavation in the southwest has decreased in size. At least two buildings are present in the central north adjacent to the road.
- 3.1.3.6 The 1979 reproduction (SK06) shows with the majority of the site as vacant bare or vegetated land except for the village, the conveyor and associated railway line and roads. All of the building's in the central north have been removed. However, some small structures are present in the central north. The excavation in the southwest appears to have ceased as vegetation is present. A small area of bare land is visible in the centre, west of the village.
- 3.1.3.7 The 1984 reproduction (SK07) only shows the central and northern parts of the site, which documents similar condition to the 1979 reproduction. The road terminates at the eastern end of the village. Pastoral land is now present in the north. The circular object to the south of the village is clearly visible.
- 3.1.3.8 The 1991 reproduction (SK08) shows similar conditions to the 1979 and 1988 reproduction. The central north and northern parts of the site are now planted with rows of trees. The central west and west is pastoral land except for the land around watercourses which, is heavily vegetated.
- 3.1.3.9 The 1995 reproduction (SK08) shows the conveyor in the north, three residential properties, pines trees to the central north and north and vacant land to the west except for the vegetation associated with the watercourses.
- 3.1.3.10 The 2008 reproduction (SK10) shows the conveyor in the north, pines trees to the central north and north, pastoral land in the central south and vacant land to the west except for the vegetation associated with the watercourses. A small structure is present in the central south. The circular structure in this area is still present.
- 3.1.3.11 The 2016 reproduction (SK11) shows the conveyor in the north has been removed with only the concrete pad and railway line remaining. The reminder of the site documents similar conditions to the 2008 reproduction.

### 3.1.4 Kimihia East

- 3.1.4.1 The 1941 reproduction (SK01) shows the site as predominantly pastoral land or vegetated vacant land. A road dissects the site roughly in the centre from north to south. West of this road is pastoral land including a dwelling in the central north. East of this road is vacant vegetated land. All boundaries appear to be fenced except in the southeast.
- 3.1.4.2 The 1963 reproduction (SK02) shows the site as predominately vacant land. Pastoral land is present in the north. Excavations are present in the southwest and potentially in the central north adjacent to the boundary.
- 3.1.4.3 The 1966 reproduction (SK03) shows similar conditions to the 1963 reproduction. The grove of trees in the central north has increased in size. The northern and eastern boundaries appear to be fenced.
- 3.1.4.4 The 1969 reproduction (SK04) is considered to show very similar conditions to the 1963 and 1966 reproductions.
- 3.1.4.5 The 1973 reproduction (SK05) shows similar conditions to the 1969 reproduction. Most of the pastoral land is vegetated. Excavations appear to be no longer present in the northeast and the excavation in the southwest has decreased in size. The dwelling in the central north is no longer present.
- 3.1.4.6 The 1979 reproduction (SK06) shows very similar conditions to the 1973 reproduction.
- 3.1.4.7 The 1984 reproduction (SK07) shows similar conditions to the 1979 reproduction however, it only covers the western side of the site.
- 3.1.4.8 The 1991 reproduction (SK08) shows the site as pastoral land in the north, pastoral punctuated with trees/bush in the centre and pastoral surrounding the area of bare land in the south. The road in the centre is still present. A small structure is visible in the central south within the area of excavations. No other structures are visible. The northern and western boundaries appear to be fenced.
- 3.1.4.9 The 1995 reproduction (SK09) shows similar conditions to the 1991 reproduction. The excavations in the south is now pastoral and the structure has been removed.
- 3.1.4.10 The 2008 reproduction (SK10) shows similar conditions to the 1995 reproduction. The amount of vegetation in the centre and central south has increased in area and density.

### 3.1.5 Kimihia West

- 3.1.5.1 The 1941 reproduction (SK01) shows the site as pastoral land with vegetation a number of structures and roads. Pastoral land is present over the majority of the site with a grove of trees in the north, bush and trees in the centre surrounding a residential site, scrub in the northeast, vegetation within the gullies and around a pond in the west. The residential site contains at least two building's. A least two structure are present in the north to the south of the grove of trees. At least two small structures are present in the southeast adjacent to Kimihia Road. At least three small structures are present in the south. A small structure is present in the west. All boundaries appear to be fenced except in the southeast.
- 3.1.5.2 The 1963 reproduction (SK02) shows similar conditions to the 1941 reproduction. A road dissects the site roughly in the centre from north to south. Building's and curtilage straddle this road in the north. Excavations are present in the northeast with a road running south to the central road. The structures in the southeast and west are no longer present.
- 3.1.5.3 The 1966 reproduction (SK03) shows similar conditions to the 1963 reproduction.
- 3.1.5.4 The 1967 reproduction (SK04) shows similar conditions to the 1966 reproductions except the majority of buildings in the north to the east of the central road, have been removed.
- 3.1.5.5 The 1974 reproduction (SK05) shows similar conditions to the 1967 reproduction. All buildings and structures are no longer present. The excavation area has increased in size.
- 3.1.5.6 The 1979 reproduction (SK06) shows similar conditions to the 1974 reproduction.
- 3.1.5.7 The 1991 reproduction (SK08) shows the site as predominately pastoral. Pockets of trees are present in the centre both sides of the road. Excavations in the centre and northeast. Vegetation is present around the excavations in the northeast. Bush is present in the west around the pond. No structures are present.
- 3.1.5.8 The 1995 reproduction (SK09) shows similar conditions to the 1991 reproduction. The excavation areas in the centre and southeast are now pastoral or in the process of becoming pastoral.
- 3.1.5.9 The 2008 reproduction (SK10) shows similar conditions to the 1995 reproduction.



## 3.2 Aerial Oblique Photos

- 3.2.1 Reproductions of aerial oblique photos are included in this report as SK13 (1954) to SK19 (1970) and are located in Appendix C.
- 3.2.2 The 1954 reproduction (SK13) shows part of the site looking towards the east. Lake Kimihia and the opencast mine is in the foreground, buildings and the village is in the midground, with the pastoral farm, vegetation and excavations in the background.
- 3.2.3 The 1958 reproduction (SK14) shows part of the site looking towards the south. The pit is present in the foreground. The buildings in the mid ground to the east include the conveyor and two probable workshops. A series of buildings and then the village is visible further to the south. In the distance appears to be a series of building, which resemble a typical New Zealand school of this era. The buildings to the north and west are clearly residential dwellings. The land in the south and west is pastoral with vegetation present adjacent to natural watercourses. The photo clearly documents the hilly nature of the site.
- 3.2.4 The 1959 reproduction (SK15) shows most of the site looking towards the north. In the foreground to the west is pastoral land and vegetation present adjacent to natural watercourses. In the central foreground is an area of excavation which, includes a building. Also visible is the probable school and residential dwellings. In the midground is a dwelling, village and then a series of building including the probable workshops and conveyor. In the background is the main pit with several buildings and structures visible. In the midground to the east is a building and yard. In the midground to the east is pastoral land and an area of excavation.
- 3.2.5 The 1959 reproduction (SK16) shows most of the site looking towards the southwest. In the foreground to the east is the pit. Structures are visible adjacent to the road and trucks are visible on the roads. In the foreground to the west is ponded water and within the water appears to be a barge with a pipe to Kimihia Lake. In the midground within the pit are a number of small structures. In the midground to the east on the rim of the pit is a number of buildings including the two probable workshops clearly showing the doors into these building's and the conveyor. Railway lines and railway carts are visible either side of the conveyor. In the background is the entry/exit road, pastoral land, a number of buildings and wetlands.
- 3.2.6 The 1964 reproduction (SK17) shows most of the site looking towards the southwest. In the foreground to the east is the pit. In the foreground to the west is ponded water. In the midground within the pit are a number of small structures. In the midground to the east is a number of small buildings adjacent to the roads. Further back to the east, on the rim of the pit, is a number of building's including the two probable workshops, a probable refuelling facility and the conveyor. Railway lines and railway carts are visible either side of the conveyor. East beyond the railway line are a number of building's which, are considered to be administration buildings. East beyond a road and watercourse is the residential village and further east is a residential dwelling. In the background is the entry/exit road, pastoral land, a number of buildings and wetlands.



- 3.2.7 The 1966 reproduction (SK18) shows most of the site looking towards the northwest. In the foreground immediately beyond the road is pastoral land, bush and an area of excavation. The school and residential dwellings are present on the left adjacent to a road that runs through the site. Beyond the central excavations is a building, then the village, then a series of building associated with the mine. In the background is the main pit. East of the excavation is bushland and further to the east is pastoral land. To the west is pastoral land and wetlands.
- 3.2.8 The 1970 reproduction (SK19) shows the site looking towards the southeast. In the foreground is the pit with buildings on the rim in the midground. Beyond is a road, then the village, a building and then an area of excavations surrounded by bush. Beyond the mine in the east is a number of small buildings either side of the road and then pastoral land. Beyond the mine and entrance to the mine site is wetlands and pastoral land.

### 3.3 The First 100 Years, Kimihia School, 1897 to 1997, Photos and Images

- 3.3.1 Reproduction of photos and images and their captions are taken from *The First 100 Years, Kimihia School, 1897 to 1997* are included in this report as SK20 to SK and are located in Appendix D.
- 3.3.2 The reproduction SK20 shows Kimihia School looking to the northeast.
- 3.3.3 The reproduction SK21 is a memory map of the area drawn by Mr. Arthur Holland showing the major features of the area in the years between 1930 and 1945. Of particular interest is the location of Taupiri /Holland Mine, which would place the above ground workings of the mine currently on the wall of the historic coal pit in the north.
- 3.3.4 The reproduction SK22 is a 1991 photo showing the historical location of Kimihia School looking to the south. In the background appears to be a quarry.
- 3.3.5 The reproduction SK23 is a 1895 photo of The Taupiri Reserve Mine (Holland's Mine) looking to the west.
- 3.3.6 The reproduction SK24 is a 1950's photo of the mine taken from the rim. The opencast pit is in the centre. The workshop is located on the left and the conveyor and associated bins are located on the right.
- 3.3.7 The reproduction SK25 is a photo of the main workshop located immediately adjacent to the conveyor.
- 3.3.8 The reproduction SK26 is a photo of workshop number 2 located on the rim.
- 3.3.9 The reproduction SK27 is a photo of the 120 B electric excavator.
- 3.3.10 The reproduction SK28 is a 1996 photo of Kimihia mine.

## 4.0 CONSULTATIONS AND LITERATURE REVIEW

### 4.2 Waikato District Council

- 4.1.1 Consultation was not undertaken with WDC as it was considered that they would not hold any significant additional information to that provided by WRC.

### 4.2 Waikato Regional Council

- 4.2.1 The following information was requested from the WRC:

- Selected Land Use Status (SLUR);
- consents and or permits issued to the site;
- pollution incidents at the site; and
- immediately adjacent SLUR sites and any reports for these sites.

- 4.2.2 The Colliery and Tawa Road sites are both included on WRC SLUR as presented in Table 2: WRC SLUR.

**Table 2: WRC SLUR**

<b>SITE ID/NAME</b>	LUI02391 Solid Energy Huntly East Coal Mine
<b>STATUS</b>	Current record.
<b>CLASSIFICATION</b>	Verified HAIL – no sampling
<b>HAIL</b>	E7 Mining industries B4 Power substation A17 Storage tanks for fuel and other chemicals

- 4.2.3 WRC also advised that they hold no contaminated land management reports for this site. There is no record of any pollution incidents having occurred.
- 4.2.4 The site is currently not consented by WRC however, the site was recently consented by WRC as documented in Table 3: Recent WRC Consents.

**Table 3: WRC Consents**

<b>AUTHORISATION</b>	<b>DATE</b>	<b>TYPE</b>	<b>PURPOSE</b>
AUTH117784.01.01	2012	Water Take	Intercept and take approximately 6,000 cubic meters per day of groundwater from the Huntly East Mine
AUTH117786.01.01	2012	Discharge	Discharge up to 11,000 cubic metres per day of treated mine water and stormwater into the Kimihia Wetland.
AUTH108829.01.01	2012	Water Diversion	Divert groundwater and surface water to maintain water levels in areas.

- 4.2.5 An immediately adjacent site is listed on the SLUR. This site is located immediately adjacent to the northeastern boundary of McVie Road. SLUR information for this site is present in Table 4: WRC Immediately Adjacent SLUR.

**Table 4: WRC Immediately Adjacent SLUR**

<b>SITE ID/NAME</b>	LUI07340 Huntly Gun Club/Huntly Clay Target Club
<b>STATUS</b>	Current record
<b>CLASSIFICATION</b>	Contaminated
<b>HAIL</b>	C2 Gun clubs including clay target clubs that used lead munitions outdoors

- 4.2.6 The site is listed as 'Contaminated' as WRC holds a Detailed Site Investigation including a lead and Bezo(a)pyrene equivalent (BAP eq) contour maps completed by OPUS which documents the site as being contaminated. In summary the report identified lead concentrations across the site above the NES lead Soil Guideline value for an industrial landuse scenario (the intended use of the site). The lead contour map identified some of the highest concentrations (above the NES lead SGV of 3,300 ppm) at the site boundary. The BAP contour map documented concentrations below NES Rural Residential SGV at the northern boundary.

### 4.3 Mr. Murray Allen, Site Owner

- 4.3.1 Mr. Murray Allen brought the Colliery in 2018 and the farm site in 1987. Mr. Allen stated that he has lived in this area for most of his adult life and he is now 80. Mr. Allen stated that his son Greg has been the farm manager since they purchased the site in 1987.
- 4.3.2 Mr. Allen stated that they brought the Colliery from Solid Energy New Zealand (SENZ) with a Management Plan documenting that the site had been rehabilitated. Mr. Allen also stated that this Plan had been signed off by the Waikato Regional Council.
- 4.3.3 Mr. Allen stated that the site was slowly being developed into a lake with associated facilities. As part of the work they had removed all concrete foundations from the pit floor and stored it on the old workshop and office accommodation concrete foundations. The concrete is going to be reused in future developments such as roads, farm accessways and foundations. This area will be used as a native plant nursey until flooded by the lake in the next ten years, with the seedlings planted around the site. The existing asphalt driveway down to the pit and the car park at the top will become the accessway and carpark for the lake. The flat grassed land at the top of the pit in the southeast will be used as the main area for accommodation, education and café etc. The land on which the railway sidings were located will be used as the maintenance workshop and yard and will be screened from the adjacent facilities with native trees. At this stage no earthworks will occur in this area.
- 4.3.5 Mr. Allen stated that quarries on the farm site were clay quarries and to his knowledge no fuel was stored at the site.

- 4.3.6 Mr. Allen stated that even though waste at the village was more than likely collected by the council a small amount of non-hazardous waste had been dumped in the stream as they removed approximately a trailer load of when they purchased the site.

#### 4.4 Mr. Greg Allen, Colliery Site Manager and Farm Manager

- 4.4.1 Mr. Allen stated that at the time of purchase in 1987 no chemical storage, landfills or sheep dips were noted on the farm. To his knowledge superphosphate was not applied on a regular basis as the farm is only marginal pastoral at the best.
- 4.4.2 Mr. Allen stated that they have not landfilled any waste at the farm site as the dump and later transfer station is located only minutes away. No hazardous substances have been stored or used at the farm site apart from Roundup and no dipping has occurred. Superphosphate has not been applied as it is not worth the effort as the farm is only marginal pastoral.
- 4.4.3 Mr. Allen stated that they have planted large areas of the site in pine and more recently in native trees predominantly around the gully systems and wetland area.
- 4.4.4 Mr. Allen stated that the concrete circular structure behind the village was a water reservoir for the village.
- 4.4.5 Mr. Allen stated that the railway line that entered the Colliery in the south and up to the concrete pad in the centre was removed by SENZ as part of the site rehabilitation work. The ballast beneath the railway line has since been used as road cover in the northeast of the site.

#### 4.5 Mr. Hank Ollington, East Mine Onsite Environmental Officer

- 4.5.1 Mr. Ollington stated that he worked at the mine from 1987 till 1999 as Electrical Supervisor but also held the role of Onsite Environmental Officer.
- 4.5.2 Mr. Ollington stated that SENZ were extremely aware of their environmental obligations and as such the workshop and refuelling facilities were extremely well run. During his time no major spills occurred and no waste was buried or burnt at the site. All waste was taken away by waste contractors. Mr. Ollington stated that no refuelling or major vehicle repairs occurred within the pit. In fact no hazardous activities occurred within the pit.
- 4.5.3 Mr. Ollington stated that he had spent his entire working life in the mining industry including at other open cast mines and whilst he could not comment specifically on the Kimihia operation he would be surprised if vehicles would have been refuelled or maintained in the pit as this practice did not occur at other mines he worked in. The waste from the workshops and village probably was buried with the overburden as this was common practice.

#### 4.6 Mr. John Watkin, East Mine Diesel Mechanic

- 4.6.1 Mr. Watkin stated that he worked as a diesel mechanic in the east mine workshop from approximately 1980 till 2005. During that time the house keeping at the workshop was very good. No major spills occurred and the concrete was kept in a very good condition. All hazardous substances were stored in drums in a bunded concrete area by the refuelling facility. Waste oil was collected and piped into above ground separator tanks which, were located on outside on northern wall of the workshop. No waste was buried or burnt at the site.
- 4.6.2 Mr. Watkin stated that the refuelling facility comprised an aboveground steel tank stored in a bunded concrete container and a bowser located on an adjacent concrete pad. Mr. Watkin does not recall any major spills occurring.
- 4.6.3 Mr. Watkin stated that the old Kimihia Mine workshops on the rim had long gone when he started. No evidence of them having ever been present. Mr. Watkin doubted that the workshops would have had concrete floors.

#### 4.7 Mr. Alan Monigatti, North Island Environmental Manager Bathurst

- 4.7.1 Mr. Monigatti was the SENZ Environmental Manager for the Huntly East Mine. Attempts to contact Mr. Monigatti was made on several occasion however, he did not reply. Note one of the email requests was for the release of a CSI 2012 Benchmarking Report of the Huntly East Mine Refuelling Facility.

#### 4.8 Solid Energy New Zealand, Management Plan Huntly East Mine, 2018

- 4.8.1 A summary of the plan is presented below. A full copy of the plan is available upon request.
- 4.8.2 **Purpose**
  - 4.8.2.1 Provide the future landowner with information about the coal mining operation that took place at the site, the potential hazards associated with mining activities that may remain on the site and recommendations for managing the risk.
- 4.8.3 **Background**
  - 4.8.3.1 Huntly East Mine was an underground coal mine which commenced operation in 1978 and was owned and operated by SENZ.
  - 4.8.3.2 The mine produced coal from 1979 to 2015.
- 4.8.4 **Mine Closure**
  - 4.8.4.1 A closure plan was developed to ensure an appropriate sequence for closure that would meet all applicable safety health and environmental regulations and the site would be left in good order for future utilisation by new owners.

- 4.8.4.2 Based on the concept that the old Kimihia Opencast area in which the majority of surface structures and the mine portals were situated would be allowed to flood resulting in a lake.
- 4.8.4.3 The main hazard is spontaneous combustion. However, this risk is completely removed when the mine workings are flooded.

#### 4.8.5 Handover to New Owners

- 4.8.5.1 Most buildings, the processing plant and residual coal stockpiles have been removed. A general tidy up has been carried out with some minor re-contouring of surfaces to remove steep banks or holes.

#### 4.8.6 Management Plan

- 4.8.6.1 Recommend that the entire site is periodically inspected to ensure site security is maintained and hazards are identified and addressed promptly.
- 4.8.6.2 Recommend bi-monthly gas sampling from the three mine portals until the portals are no longer accessible due to the rising lake level.

### 4.9 The First 100 Years, Kimihia School, 1897 to 1977

- 4.9.1 This booklet was compiled by A D MacDonald and published by The Kimihia Primary School. The following are extracts which, are considered to be relevant to this investigation.
  - 4.9.1.1 In 1944 the New Zealand State Coal Mines took over the mine and decided to close the underground workings and use opencast methods. Downer and Co were contracted to work the mine.
  - 4.9.1.2 The dredge will suck up more than 4.5 million cubic yards of overburden and drain 60 acres of ponded water to let earthmovers strip overburden from the coal seam. The dredge has no rudder or propellers and moves by using its winches which are attached to cables moored on the floor.
  - 4.9.1.3 In 1972 Winstone's took over the now vacant school paddock and the surrounding farm and recovered the underlying clay for its brickwork operations in Huntly.
  - 4.9.1.4 In 1976 coal extraction from the Kimihia Opencast Coal Mine ceased. Construction of mine buildings, coal handling and storage facilities, road and rail access and other headworks commenced in 1977.

#### **4.10 Tonkin and Taylor, Site Appraisal and Preliminary Assessment Report, 2019**

4.10.1 A summary of what is considered to be relevant to this investigation is presented below.

##### **4.10.2 Purpose**

4.10.2.1 Provide the landowner with resource engineering and science advice related to the new Kimihia Lake and surrounds. The report is based solely on a review of literature undertaken to date.

##### **4.10.3 Water Quality**

4.10.3.1 The key object is that the lake water meets recreational standards.

4.10.3.2 The only chemical monitoring of lake water to date was undertaken by WRC staff in November 2018. Results document elevated boron concentrations above Australia and New Zealand Environment and Conservation Council Fresh Water (ANZECC) environmental guideline 95 trigger level but were below ANZECC guidelines for recreational water use. However, the report concluded that the results are of limited use in predicting the water quality going forward considering the volume yet to fill. In addition, the client advised that the areas responsible for leaching boron have been capped and compacted with clay.

4.10.3.3 The report also stated that the Kimihia Wetland is elevated with boron concentrations.

4.10.3.4 There is a stream flowing from the catchment to the south which, originally flowed into the lake but was diverted during mine construction. The stream flows around the south of the site, along East Mine Road towards the Waikato River.

#### **4.11 Phoenix Consulting Engineers, Soil and Site Assessment**

4.11.1 Phoenix Consulting Engineers undertook a soil investigation on the southern part of 191 Kimihia Road which, is not part of this PSI. In total nine test holes were drilled to two metres depths with the soil determined to be silt and clays.

#### **4.12 Envirochem Evaluation Ltd, Preliminary Site Investigation, 2016**

4.12.1 Envirochem Evaluation Ltd undertook a PSI on the southern part of 191 Kimihia Road which, is not part of this PSI. The site history was considered to be pastoral with a historical dwelling present. The conceptual site model determined that cadmium as a result of superphosphate application, arsenic from wood treatment and dipping and lead from paint could pose a risk to future occupants. As a result, three composite soil samples comprising three cores were collected across the proposed subdivision site and three composite samples comprising three cores were collected from the area of the historical dwelling and analysed for metals. No elevations were detected above NES rural residential Soil Contaminant Standards.

- 4.12.2 Note it is considered that this PSI was not completed in accordance with MfE Contaminated Land Management Guidelines. A historical residential dwelling is not HAIL and therefore sampling should not have been undertaken at this location. Samples of the site were not completed in accordance with MfE Contaminated Land Management Guideline 5 or the laboratory result of the composite sample multiplied by the number of samples collected as per Guideline 5. However, if the cadmium concentrations which, is considered to be the only potential contaminant of concern at the site, are taken as representative samples and not composites all of the concentrations are below the NES rural residential cadmium Soil Contaminant Standard.



## 5.0 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

### 5.1 Geology

- 5.1.1 The Land Resource Information System (LRIS) Portal documents the surface soil at the site as clay or a silt loam.
- 5.1.2 Phoenix Consulting Engineers, soil investigation of the southern part of 191 Kimihia documented silt and clays at the site down to at least two metres.

### 5.2 Hydrogeology

- 5.2.1 Information from the Waikato Regional Council indicates a probable groundwater system beneath the site at about 10 metres however, it is possible that groundwater may be present at 4 m. This information is based on the bores located within 500 metres of the site as presented in Table 5: Bore Information.

**Table 5: Bore Information.**

NUMBER	NAME	DEPTH	SCREEN	CASING DEPTH
72_6616	NZ Transport Agency BH11	25		
72_10358	State Highway 1 and Evans Road	14.5		3.5
72_6615	NZ Transport Agency BH9	25	19	
72_7165	Waikato Expressway BH55	23	17	
72_6611	NZ Transport Agency BH7	15.5	10	10
72_7619	Expressway Huntly Section	15	12	

### 5.3 Hydrology

- 5.3.1 Surface water is present at the site in a number of locations. The new Kimihia Lake is located in the historical opencast mine pit. A pond is present in the north in an old opencast pit. A stream is located in the east which flows north towards the lake upon where it is diverted to the west, south of East Mine Road towards the Waikato River. A wetland is located along the western boundary of the site and in the west immediately south of East Mine Road which, flows into the above stream. A number of streams and ephemeral streams are located within hollows and gullies on the farmland which, are considered to flow into the above stream with the exception of the ephemeral stream in the northeast which, is considered to flow to the north of the site. Also present are two ponds on the farmland in the centre.
- 5.3.2 The Tonkin and Taylor 2019 assessment determined that water quality of the lake met recreation values. The water quality of the wetland was considered to be similar to surround wetlands with boron elevated. The water quality of the stream was not assessed.

## 6.0 SITE EVALUATION

### 6.1 Walkover

6.1.1 A site walkover was undertaken by Guy Sowry on 26 August 2020. At the time of the walkover the day was overcast with rain. A selection of the photos taken on this day are provided for in Appendix E.

#### 6.1.2 Colliery Observations

6.1.2.1 The majority of the concrete floor of the SENZ Workshop was covered with broken up concrete. What was visible was marginally cracked and damaged with minimal staining observed. No evidence of the refuelling facility was visible. There was no physical evidence of the older Kimihia Open Pit workshops or potential refuelling facilities on the flat land in the central east.

6.1.2.2 There was no obvious evidence that the flat land in the central east had been used to store coal. Only small bits of coal were present on the ground. The concrete pad with railway line for the historical coal loading area was marginally cracked and damaged with no significant staining noted. This area was being used as a service area and storage area for the development of the site. No hazardous substances were noted.

6.1.2.4 No odour and no vegetation stress was noted at this site.

#### 6.1.2 Tawa Site Observations

6.1.2.1. No waste/rubbish was noted in any of the drains or wetlands at this site.

6.1.2.2 No straining was noted on any of the villages structural remains including the circular object, no asbestos like material was noted on any of these remains and no hummocky land was present to suggest landfilling.

6.1.2.3 No asbestos fibres were observed on the farm tracks that had received ballast from the railway line. However, it should be noted that these would be difficult to see. Only small amounts of coal were observed on the rehabilitated land further to the north.

6.1.2.4 No odour and no vegetation stress was noted.

#### 6.1.3 Kimihia East and Kimihia West Observations

6.1.3.1 No waste/rubbish was noted in any of the drains, gullies or wetlands at this site.

6.1.3.2 No historical structures including dipping foundations were noted and no hummocky land was present to suggest landfilling.

6.1.3.2 No odour and no vegetation stress was noted.

## 6.2 History

### 6.2.1 Aerial Photos

- 6.2.1.1 An aerial photo from 1941 shows a lake in the north, north west and central west with the remainder of the site pastoral land with dwellings and other structures present.
- 6.2.1.2 Aerial photos from 1963 to 1973 show an open cast mine in the north, northwest and central west with buildings on the rim of the pit in the southeast and a railway line in the south and southeast. The remainder of the site is pastoral land punctuated with: vegetation; wetlands or vegetated gullies; excavations in the north and central east which, increase and decrease in size; the village with a circular object; and dwellings and other structures in various locations which, come and go.
- 6.2.1.2 Aerial photos from 1979 to 2016 show a mine pit with various levels of water present in the north and west with buildings in the pit in the southeast including a conveyor and associated hopper with a railway line and yard. The remainder of the site is similar to the above however: by 1995 only three dwellings remain in the village; the building's in the central south straddling Tawa Road have gone by 1967; all buildings in the south have gone by 1979; and all excavations have gone by 1995.

### 6.2.2 Aerial Oblique Photos

- 6.2.2.1 Oblique aerial photos from 1954 to 1970 document: an open cast mine with buildings on the rim including at least two probable workshops, a refuelling facility and railway line with associated hopper; the residential village; a school and residential dwellings straddling Tawa Road; and pastoral land punctuated with vegetation, wetlands or vegetated gullies and excavations.

### 6.2.3 Photos and Images

- 6.2.3.1 Photos and images from *The First 100 Years, Kimihia School, 1987 to 1997* document: a 1895 photo of Taupiri Reserve Mine or Hollands Mines with associated railway line and yard; a memory map from a local resident documenting the location of the Taupiri/Hollands Mine; various photos documenting workshops, the railway line yard, conveyor and hopper on the rim of the pit; various images and photos of Kimihia School and associated dwellings straddling Tawa Road and a 1991 photo documenting a clay quarry behind the old location of Kimihia School.

### 6.2.6 Waikato Regional Council

- 6.2.6.1 The site is listed on WRC SLUR as: Solid Energy East Coal Mine; Verified HAIL – no sampling; HAIL E7 mining and HAIL A17 Storage tanks for fuel and chemicals. No contaminated land reports are held.

6.2.6.2 There is no current permits or consents issued to the site and no record of pollution incidents at the site.

6.2.6.3 An immediate adjacent site to the northeast is listed on WRC SLUR as: Huntly Gun Club; Contaminated; HAIL G2 – Gun club that used lead munitions outdoor'. A DSI documents concentrations of lead above the NES industrial SGV immediately adjacent to the site.

#### 6.2.7 **Mr. Murray Allen, Current Site Owner**

6.2.7.1 The Colliery was purchased in 2018 and the farm was purchased in 1987. Mr. Allen stated that a SENZ Site Management Plan documented that the site had been rehabilitated and that it had been approved by WRC.

6.2.7.2 Mr. Allen stated that the excavation sites on the farm were clay quarries with no hazardous substances present.

#### 6.2.8 **Mr. Greg Allen, Colliery Site Manager and Farm Manager**

6.2.8.1 Mr. Allen stated that sheep dipping, chemical storage or landfill has not occurred at the farm since 1987 and there was no evidence to suggest that these activities ever occurred. No superphosphate has been applied since 1987.

6.2.8.2 Mr. Allen stated that no chemicals have been stored at the Mine Site since they took ownership.

6.2.8.3 Mr. Allen stated that ballast from the historical railway line has been used on Colliery Site accessways in the north.

#### 6.2.9 **Mr. Hank Ollington, East Mine Onsite Environmental Officer**

6.2.9.1 Mr. Ollington stated he worked at the site from 1987 till 1999 and during that time the workshop and refuelling facilities were extremely well run and no major spills occurred. No waste was buried or burnt on the site.

#### 6.2.10 **Mr. John Watkin, East Mine Mechanic**

6.2.10.1 Mr. Watkin stated he worked at the site from 1980 till 2005 and during that time the housekeeping at the workshop were very good. No major spills occurred. All chemicals were stored in a concrete bunded area next to the refuelling facility except waste oil which, was stored in above ground steel tanks. The refuelling facility comprised one fully contained above ground tank in a concrete bunded area and a bowser on a concrete bunded pad. No major spills occurred.

#### 6.2.11 **Solid Energy New Zealand Management Plan**

6.2.11.1 Operating below ground coal mine from 1979 to 2015. Most buildings, the processing plant and residual coal stockpiles have been removed. The site has been recontoured.

### 6.2.12 The First 100 Years, Kimihia School, 1987 to 1977

- 6.2.12.1 A memory map documenting Taupiri/Hollands mine till at least 1945.
- 6.2.12.1 The onsite dredge was powered by winches which were attached to cables moored on the floor of the lake
- 6.2.12.3 in 1972 Winstone's took over the clay quarries.

### 6.2.13 History Summary

- 6.2.11.1 A summary of the above information is presented in Table 6: History Summary.

**Table 6: History Summary**

SITE	ACTIVITY	APPROX DATES	EVIDENCE
Colliery	Pastoral	Pre 1941 – 1950's	Aerial photos. Anecdotal.
	Taupiri/Hollands underground mine, colliery and railway line/yard	1895 - 1945	Photo. Anecdotal – memory map.
	Kimihia open cast mine and colliery with motor vehicle workshops and probable fuel dispensing	1950's - 1974	Aerial photos. Oblique photos. Literature. Anecdotal. SENZ Management Plan.
	SENZ Underground mine and colliery with motor vehicle workshops and probable fuel dispensing.	1978 -2015	Aerial photos. Oblique photos. Anecdotal. SENZ Management Plan. Unsighted CSI Report.
Tawa Road	Underground mine – Taupiri/Hollands	1895 - 1945	Photo. Aerial photos. Anecdotal.
	Part of colliery – hopper, railway and coal yard	1978 - 2015	Aerial and obliques photos. Anecdotal.
	Pastoral land	Pre 1941 – to present	Aerial and obliques photos. Anecdotal. Site walkover.
Kimihia East and West	Pastoral land	Pre 1941 – to present	Aerial and oblique photos. Anecdotal. Site walkover.
	Clay quarries	1963 - 1995	Aerial and oblique photos. Anecdotal.

## 6.3 Potential Ground Contaminants

### Coal Mine and Colliery

- 6.3.1. The site has been associated with the mining industry from circa 1854 to 2018.
- 6.3.2 The MfE considers the following hazardous substances to be typically associated with mining industries: arsenic; mercury; cyanide, sulphides, metals and hydrocarbons associated with fuel storage. However, coal mines do not use or have compounds of or by products of cyanides and sulphides.
- 6.3.3 The HAIL activity of coal or coke yards has also occurred at this site. The MfE has identified the following hazardous substances that are typically associated with coal or coke yards: hydrocarbons (practically polycyclic aromatic hydrocarbons) boron and arsenic.

### Motor Vehicle Workshops

- 6.3.4 Motor vehicle workshops have been present at the site from circa 1950 to 2015. It is also possible that a workshop may have been present on site associated with the Taupiri/Hollands mine between the years 1895 to 1945.
- 6.3.5 Hydrocarbons and metals associated with waste oil are considered to be the typical hazardous substances found at motor vehicle workshops.

### Railway Line and Yard

- 6.3.6 A railway line has been present at the site since at least the 1854.
- 6.3.7 Railway lines and yards where constant braking has occurred may have asbestos fibres present as a result of trains and associated carriages having asbestos brakes.
- 6.3.8 A site walkover identified that the railway line has been removed except in the yard beneath the historical hopper. This yard is covered with a concrete pad. Anecdotal information states that the line was removed by SENZ. However, anecdotal information also states that the ballast beneath the railway line has been used for onsite roading.

### Landfilling

- 6.3.9 Anecdotal evidence suggest that domestic waste from the village was either collected by the council or disposed off with mine mullock. If was disposed of with mullock it is not considered an issue as domestic waste does not contain significant amounts of hazardous material.

## Pastoral Land

6.3.10 Pastoral land prior since at least 1942 to current day. Whilst pastoral farming is not considered to be HAIL the farming activities of livestock dipping, landfilling (including offal pits), chemical storage, fuel storage, persistent pesticide application (DDT and Dieldrin to control grass grub) and the intentional or accidental release of a hazardous substance, are. A Waikato Regional Council Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents the accidental release of a hazardous substance from farming practices to be: cadmium in superphosphate; and zinc in facial eczema remedies. Each of the above potential HAIL are presented below in comparison to the most sensitive intended landuse scenario of rural residential.

### 6.3.11 Livestock Dipping, Farm Landfilling, Chemical and Fuel Storage

6.3.11.1 Aerial photos clearly document that the site was not occupied by structures associated with livestock dipping. Anecdotal information documents that livestock dipping has not occurred since 1987 and no evidence to suggest it ever occurred. A site walkover documented no evidence of structures associated with livestock dipping.

6.3.11.2 Aerial photos from 1942 to 1995 document structures at the site. These structures may have been used to store chemicals or fuel. Anecdotal information documents that no chemicals or fuel other than Roundup have been used or stored at the farm site since 1987, other, and no evidence to suggest it ever occurred. No evidence of chemical storage i.e. soil staining or odour noted during site walkover. As it is over 30 years since chemicals or fuel may have been stored at the site it is considered that they will have degraded to be well below NES rural residential values.

6.3.11.3 Anecdotal information documents that farm landfilling has not occurred at the farm site since 1987 and no evidence to suggest it occurred prior. No evidence of landfilling i.e. hummocky land noted during site walkover.

6.3.11.4 Therefore, potential ground contaminants from livestock dipping, and farm landfilling has not occurred at the site and chemical storage may have occurred but due to the time since it may have occurred is not considered to be an issue at the site.

### 6.3.12 Persistent Pesticide Application

6.3.12.1 It is not known if DDT and any other organochlorines were applied to the site historically. Glyphosate has been used however, it is not considered to be a persistent pesticide as its half-life is approximately 96 days.

- 6.3.12.2 The WRC Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents a DDT high of 0.75 mg/kg for pastoral land. When this value is compared to the NES rural residential landuse no produce soil guideline value (SGV) for DDT of 120 mg/kg, DDT and other organochlorines are not considered to be potential ground contaminants at the site.

### 6.3.13 Accidental Release of Hazardous Substances - Cadmium

- 6.3.13.1 Anecdotal information documents that Superphosphate was applied on the odd occasion historically but it has not been applied since 1987 as the land is only marginal pastoral and therefore it is not worth the effort.
- 6.3.13.2 Therefore, the accidental release of cadmium from superphosphate application is not considered to be a potential ground contaminant at the site.

### 6.3.14 Accidental Release of Hazardous Substances - Zinc

- 6.3.14.1 Facial eczema remedies may have been given to stock that grazed the site. Therefore, zinc from facial eczema remedies such as boluses or fortified feed, may have been passively released by stock onto the land.
- 6.3.14.2 The WRC Report titled *Historic Pesticides Residues in Horticultural and Grazing Soils in the Waikato Region*, Sally Gaw, 2003, documents a zinc high of 58 mg/kg for pastoral land. When this value is compared to a NES approved landuse scenario SGV for zinc of 200 mg/kg, the accidental release of zinc is not considered to be a potential contaminant at the site.

## Clay Quarries

- 6.3.15 Aerial photos and anecdotal information documents that at least two clay quarries have been present on the farm site since 1963 to 1995. Whilst a clay quarry is not considered to be HAIL the subsequent activity of fuel storage, is.

### Fuel Storage

- 6.3.15.1 Aerial photos from 1942 to 1995 document structures at the southernmost quarry that may have been used to store fuel. Anecdotal information documents that fuel was not sorted at the quarries. No evidence of chemical storage i.e. soil staining noted during site walkover. As it is over 30 years since fuel may have been stored and used at the quarries it is considered that PAH's will have degraded to be well below NES rural residential values.
- 6.3.15.2 Therefore, potential ground contaminants from fuel storage is not considered to be an issue at the quarries.



## Adjacent HAIL

- 6.3.16 A gun club occupied the site immediately adjacent to the east of the Colliery and north of the Tawa Site.

### Gun Club

- 6.3.16.1 The site is listed on WRC SLUR as Contaminated as an OPUS DSI documented lead elevations above the NES lead industrial landuse SGV of 3,300 ppm, as this is the intended use of the site. A lead contour map documented the highest concentrations of lead immediately adjacent to the Colliery boundary. However, concentrations immediately adjacent to the Tawa Road boundary were below the NES industrial lead SGV but above the NES recreational lead SGV of 880 ppm.
- 6.3.16.2 Therefore, lead from a gun club is considered to be a potential contaminant at the site.

### 6.3.17 Conclusion

- 6.3.17.1 Based on the above information the potential likely contaminants at the site are considered to be:
- Polycyclic aromatic hydrocarbons (PAH's) – coal mine, coal yard, fuel storage and dispensing, and motor vehicle workshops;
  - boron and arsenic - coal yard and coal mine;
  - metals - motor vehicle workshops;
  - asbestos – railway line and yard; and
  - lead - gun club.

## 6.4 HAIL Assessment

- 6.4.1 It is considered that HAIL E5 - coal yard; has occurred at 239 East Mine Road and 96 Tawa Road.
- 6.4.2 It is considered that HAIL E7 – mining industries; has occurred at 239 East Mine Road and 96 Tawa Road.
- 6.4.3 It is considered that HAIL F.4 - motor vehicle workshop; has occurred at 239 East Mine Road
- 6.4.4 It is considered that HAIL F.7 - service station; has occurred at 239 East Mine Road.
- 6.4.5 It is considered that HAIL E1 – asbestos disposal has occurred at 239 East Mine Road and 96 Tawa Road.
- 6.4.6 It is considered that HAIL H – migration of lead from an adjacent gun club has more than likely occurred at 239 East Mine Road and 96 Tawa Road.

## 6.5 Conceptual Site Model

6.5.1 Conceptual Site Models (CSM) for each HAIL for the proposed redevelopment into a recreational facility is presented in Tables 7 - 12: Conceptual Site Models.

**Table 7: HAIL E5 – Coal Yard Conceptual Site Model**

ELEMENTS		CONTAMINANTS	
		PAH's	Boron and Arsenic
HAZARD		Contact during development. Potentially mobilised during development. PAH's are considered to be marginally volatile.	
PATHWAY	Air	During development. Soil is clay. PAH's may discharge to air. However, for this to occur they need to be present at high concentrations, which is considered to be highly unlikely.	
	Stormwater	Soil will be exposed during development. Stormwater discharge directly to the soil on site however, clay soil will limit lateral migration into onsite drains and lake.	
	Groundwater	A shallow groundwater system maybe present. The clay soil will limit vertical migration of contaminants to depth.	
	Contact	Direct during site works. Direct contact is highly unlikely during occupation as site is to be covered with buildings, hardstand and vegetation. The soil at this is not considered to be of local or national importance therefore ecological contact is considered to be low.	
RECEPTOR	Human Health	On site - development and maintenance workers. Off site - none.	
	Ecological	On site – aquatic organisms in groundwater and surface waters. Off site - none.	
	Built	None.	
RISK	Human Health	<b>MEDIUM</b>	
	Ecological	<b>LOW</b>	
	Built	<b>LOW</b>	

6.5.2 The Coal Yard CSM documents a **medium** risk to human health - development workers or future maintenance workers in this historical area as they may come into direct contact with PAH's, boron and arsenic in the soil during development.

- 6.5.3 The Coal Yard CSM documents a **low** risk to the environment as the soil is not considered to be of local or national importance. The clay soil will prevent the lateral and vertical migration of any potential contaminants into adjacent watercourses.

**Table 8: HAIL E7 – Mining Conceptual Site Model**

ELEMENTS		CONTAMINANTS	
		PAH's	boron and arsenic
HAZARD		The base of the historical pit is covered by water and the walls will be covered with water. Water quality monitoring by WRC in 2018 documented concentrations below ANZECC recreational water use.	
PATHWAY	Air	Surface exposed during infilling. PAH's are considered to be marginally volatile however, for this to occur they need to be present at high concentrations, which is considered to be highly unlikely.	
	Stormwater	None.	
	Groundwater	At depth beneath the lake and therefore, more than likely confined.	
	Contact	Unlikely as development has already occurred in historical pit areas. Water during occupation.	
RECEPTOR	Human Health	On site - none. Off site - none.	
	Ecological	On site – aquatic organisms in lake. Off site - none.	
	Built	None.	
RISK	Human Health	<b>LOW</b>	
	Ecological		
	Built		

- 6.5.4 The mining CSM documents a **low** risk to human health as it is highly unlikely that site workers and future occupants will come into contact with PAH's, boron and arsenic in the historical mine pit due to the pit being currently covered with water and continued infilling to form a lake.
- 6.5.5 The mining CSM documents a **low** risk to the environment as water quality monitoring by WRC in 2018 documented concentrations below ANZECC recreational water use.

Table 9: HAIL F4 – Motor Vehicle Workshops Site Model

ELEMENTS		CONTAMINANTS	
		PAH's	Metals
HAZARD		<p>Workshop pad in pit to be used as a plant nursery until covered with lake water. Workshops locations on the rim to be developed into commercial, accommodation and education facilities.</p> <p>PAH's are considered to be marginally volatile</p>	
PATHWAY	Air	<p>Surface exposed during development.</p> <p>PAH's may discharge into the air however, for this to occur they need to be present at high concentrations, which is considered to be highly unlikely.</p>	
	Stormwater	<p>Soil will be exposed during development. Stormwater discharge directly to the soil on site however, clay soil will limit lateral migration into onsite drains and lake.</p>	
	Groundwater	<p>A shallow groundwater system maybe present. The clay soil will limit vertical migration of contaminants to depth.</p>	
	Contact	<p>Direct during site works, nursery occupation and future maintenance. Buildings, hardstand vegetation and clay to cover rim workshops.</p>	
RECEPTOR	Human Health	<p>On site – development and maintenance workers. Off site - none.</p>	
	Ecological	<p>On site – aquatic organisms in lake. Off site - none.</p>	
	Built	<p>None.</p>	
RISK	Human Health	<b>MEDIUM</b>	
	Ecological		
	Built	<b>LOW</b>	

6.5.7 The Motor Vehicle Workshop CSM documents a **medium** risk to human health as development workers may come into contact PAH's and metals in the historical workshop locations during development. The risk to future occupants is considered **low** as the historical workshop in the pit will be covered with a nursery and then with water and the historical workshops on the pit will be covered with either: hard stand; buildings; a clay soil; and vegetation.

- 6.5.8 The Motor Vehicle Workshop CSM documents a **medium** risk to the environment as potential contaminants from the workshop in the pit may discharge into the lake when this area is inundated. A **low** risk to the environment from historical workshops on the pit rim as the clay soil will prevent the lateral and vertical migration of any potential contaminants and the soil on site is not considered to be of local or national importance.

**Table 10: HAIL F7 – Service Station Conceptual Site Model**

ELEMENTS		CONTAMINANTS
HAZARD		PAH
		No development to occur at this location within pit. To be covered by lake however, contamination in this area considered to be low based on site observations and anecdotal information.
PATHWAY	Air	Soil exposed but undisturbed until covered with water. PAH's are volatile however, for this to occur they need to be present at high concentrations, which is considered to be highly unlikely.
	Stormwater	Soil will be exposed but undisturbed until covered with water.
	Groundwater	At depth beneath the pit and therefore, more than likely confined.
	Contact	None. The soil is not considered to be of local or national importance. Lake water.
RECEPTOR	Human Health	On site – none. Off site - none.
	Ecological	On site – aquatic organisms in lake. Off site - none.
	Built	None.
RISK	Human Health	<b>LOW</b>
	Ecological	
	Built	

- 6.5.7 The Service Station CSM documents a **low** risk to human health and the environment, as there are no identified potential contaminants/hazards. Without a hazard source a pathway link to potential receptors is unable to be established.

Table 11: HAIL F8 – Asbestos Conceptual Site Model

ELEMENTS		CONTAMINANTS
HAZARD		Asbestos
		Fibres potentially beneath and beside current railway line and yard. Fibres potentially located in old ballast used as roading material in the north of the site.
PATHWAY	Air	Concrete pad and surrounds to remain untouched and covered. Roading material to remain exposed.
	Stormwater	Stormwater discharge directly to the soil on site however, clay soil will limit lateral migration into onsite drains and lake.
	Groundwater	A shallow groundwater system maybe present. The clay soil will limit vertical migration to depth.
	Contact	Unlikely as development has already occurred in these areas. The soil is not considered to be of local or national importance.
RECEPTOR	Human Health	On site – none. Off site - none.
	Ecological	On site – aquatic organisms in lake. Off site - none.
	Built	None.
RISK	Human Health	<b>LOW</b>
	Ecological	
	Built	

6.5.8 The CSM documents a **low** risk to human health as potential asbestos fibres are in locations that are currently covered and are not to be disturbed during development or in an area that will only be used by site workers infrequently thereby limiting exposure by reducing airborne emissions.

6.5.9 The CSM documents a **low** risk to the environment as potential asbestos fibres are in locations that are currently covered or in an area of the site that will be rarely disturbed thereby reducing airborne emissions.

Table 12: HAIL H – Adjacent Gun Club Conceptual Site Model

ELEMENTS		CONTAMINANTS
		Lead
HAZARD		Lead shot more than likely located in the pit in the north and future lake margin in this area.
PATHWAY	Air	Exposed until filled by water or vegetated.
	Stormwater	Stormwater discharge directly to the soil on site however, clay soil will limit lateral migration into onsite lake.
	Groundwater	At depth beneath the lake and therefore, more than likely confined.
	Contact	Unlikely as development has already occurred in this area. Water during occupation. The soil is not considered to be of local or national importance.
RECEPTOR	Human Health	On site – none. Off site - none.
	Ecological	On site – aquatic organisms in lake. Off site - none.
	Built	None.
RISK	Human Health	<b>LOW</b>
	Ecological	<b>MEDIUM</b>
	Built	<b>LOW</b>

6.5.10 The CSM documents a **low** risk to human health as potential lead contamination is in an area location that has been developed including vegetated and will be either inundated by water thereby limiting contact.

6.5.11 The CSM documents a **medium** risk to the environment as potential lead contaminants from the adjacent gun club will discharge into the lake when this area is inundated.

## 6.6 Risk Assessment

6.6.1 The **medium** risk to **human health** associated with potential contaminants from the coal yard and historical workshops and **medium** risk to the **environment** associated with potential contaminants from the historical pit workshop and gun club is discussed further in section 7.0 Contamination Assessment.

## 7.0 CONTAMINATION ASSESSMENT

### 7.1 Risk Assessment Defined

- 7.1.1 A 'contaminated land' risk assessment is the process of estimating the potential impact of a hazard substance on a specified receptor and involves the following four steps:
- Hazard source – identification of the contaminants of concern;
  - Potential Receptors – define a receptor which may or may be has been exposed to the hazard source. Receptors are usually humans but it may also include other organisms such as livestock and plants or inert objects such as utilities or buildings;
  - Exposure Pathways – for a hazard source to pose a risk to a receptor a pathway of contact must exists to the hazard source. An exposed pathway consists of a transport mechanism or migratory pathway, a point of exposure and an exposure route. Human exposure routes are ingestion, consumption, dermal contact and inhalation; and
  - Risk Characterisation – estimates the risk to the receptor using the classifications of low, medium or high. Low refers to no risk. Medium refers to tolerable or acceptable risk. High refers to an unacceptable risk.

### 7.2 Hazard Source

- 7.2.1 Coal was stored and processed on the flat land east of the coal pit at 239 East Mine Road and beneath the conveyor and hopper at 96 Tawa Road. The CSM for this activity identified a medium risk to development and maintenance workers.
- 7.2.2 A motor vehicle workshop was located on the eastern wall of the pit at 239 East Mine Road and at least three motor vehicle workshops were located on the flat land east of the pit at 239 East Mine Road. The CSM for this HAIL activity identified a medium risk to development and maintenance workers and a medium risk to the environment from the workshop in the pit.
- 7.2.3 An adjacent gun club has more than likely discharged lead shot onto the land in the northeast of 239 East Mine Road and north of 96 Tawa Road. The CSM for this activity identified a medium risk to the environment.
- 7.2.4 Therefore, the hazard sources on site are considered to be:
- PAH's - coal yard and motor vehicle workshops;
  - boron and arsenic - coal yard;
  - metals - motor vehicle workshops; and
  - lead - gun club.



### 7.3 Potential Receptors

- 7.3.1 The flat land east of the pit at 239 East Mine Road on which, the coal yard and historical workshops were located is to be developed into a community central hub comprising: a café and an education centre; short term accommodation comprising a hotel, dormitories and a camping ground.
- 7.3.2 The land on which, the historical workshop in the pit will be used as a plant nursery site until it is inundated by water.
- 7.3.2 The land on which, lead shot was discharged into has already been developed including vegetated and will eventual be inundated with water.
- 7.3.3 Therefore, the potential receptors are considered to be:
- development workers;
  - future maintenance workers; and
  - aquatic organisms.

### 7.4 Exposure Pathways

- 7.4.1 The exposure pathways for human health are ingestion, inhalation and absorption of potential contaminants.
- **Ingestion** is almost always the dominant exposure route typically accounting for more than 99% of any potential exposure from impacted soil. An adult is considered to ingest about 20 mg (0.02 g) of soil or dust a day from direct contact with the soil or dust, followed by transfer to the mouth or by eating food grown on the property.
  - **Inhalation** is most commonly associated with indoor industrial settings. Outdoors inhalation usually accounts for less than 1% of potential exposure for a person living or working on a site. For this to occur the site must be predominantly bare soil and have extremely high concentrations of vapour emitting contamination present.
  - **Dermal** absorption is considered to be a negligible exposure pathway for metal contaminants as they are not significantly absorbed through the skin.
- 7.4.2 Therefore, the primary human health exposure pathway is considered to be the indirect ingestion of contaminant laden soil or dust.

## 7.5 Risk Characterisation

### 7.5.1 Soil Assessment

- 7.5.1.1 The flat land east of the pit is currently unoccupied vacant land that has been rehabilitated by SENZ including the removal of coal. During the site walkover no coal storage was noted. This area was the location of historical workshop and based on the age of these workshop it is considered highly unlikely that they had concrete pads to limit the vertical migration of contaminants.
- 7.5.1.2 The concrete pad associated with the workshop in the pit is to remain on site and will be used at the floor of the plant nursery. The concrete pad appeared to be in a reasonable condition with minimal staining noted and minimal cracking and pitting. However, only a small portion of the pad was exposed as it was being used to stored concrete rubble. Concrete is considered to be porous and therefore, it is possible that hydrocarbons may have leached through the concrete or migrated through cracks into the soil beneath. Metals will bind to soil particles on the concrete floor and eventual via wind, sweeping, movement etc within a workshop will migrate into the cracks and therefore potentially migrate into the soil.
- 7.5.1.3 The land in the north of the site in which, lead shot has been discharged to, is predominantly vegetated sloping down to the floor of the pit and subsequent lake with a strip of bare land at the top which is a road.
- 7.5.1.4 Therefore the risk to the soil at these locations is considered **medium**.

### 7.5.2 Human Health - Development and Maintenance Workers

- 7.5.2.1 Arsenic concentrations typically found in NZ coal range from 0.5 to 10 ppm. Boron concentrations typically found in NZ coal range from 10 to 120 ppm. PAH's concentrations within NZ coal have not been determined. A CSI investigation of a rehabilitated mine site on Rotowaro Road documented PAH's concentrations of <0.04 and arsenic concentration between 9 – 11. When these concretions are compared to NES industrial (the closest landuse scenario for workers) SGVs for arsenic 70 ppm, boron >10,000 ppm and BAP eq 35 ppm, arsenic, boron and PAH's are not considered to be a risk from the coal yard.
- 7.5.2.2 The California Office of Environmental Health Assessment recommends that the half-life of PAH's should be set at 570 days. Therefore, it would take approximately 15 years for PAH's to have degraded to what is considered to be very low concentrations. Therefore, as the workshops on the flat land to the east of the pit were present over 45 years ago PAH's are not considered to be a risk from motor vehicle workshops in this location.

- 7.5.2.4 Metals are natural elements and therefore do not degrade. A CSI Investigation of the historical Downers Motor Vehicle Workshop on Rotowaro Road comprising the collection of 5 samples immediately adjacent to the workshop, documented the following metal concentration range: arsenic 3 – 6 ppm; chromium 6 -14 ppm; copper 19 - 43 ppm; lead 14 – 58 ppm; and mercury 0.10 – 0.25 ppm and zinc 71 - 83 ppm. When these levels are compared to NES industrial SGVs for: arsenic 70 ppm; chromium >10,000 ppm, copper >10,000 ppm; lead 3,300 ppm; and mercury 4,200 ppm, metals are not considered to be a risk from all of the historic motor vehicle workshops.
- 7.5.2.3 Therefore, the risk to development and maintenance workers at the site is considered **LOW**.

#### 7.5.4 Environment – Aquatic Organisms

- 7.5.4.1 The pit workshop will be underwater in approximately 10 years. Therefore, based on the above half-life for PAH's it is considered that any PAH's that may have leached into the soil will have degraded to a relatively low concentration that should not pose a significant risk to aquatic organisms. When the highest metal concentrations from the CSI investigation of: arsenic 6 ppm; chromium 14 ppm; copper 43 ppm; lead 58 ppm; mercury 0.25 ppm and zinc 83 ppm are compared to Canadian Sediment Quality Guidelines (derived for the protection of aquatic species) metal values of: arsenic 17 ppm; chromium 90 ppm, copper 197 ppm; lead 91.3 ppm; mercury 0.48 ppm and zinc 315 ppm metals are not considered to be a risk to aquatic organisms.
- 7.5.4.2 The OPUS lead contour map indicates that lead shot will be present at the site in excess of 3,300 ppm. Concentration above this value exceeds the Canadian Environmental Quality Guidelines lead value of 70 ppm by a factor of 36 and therefore, are considered to pose a significant risk to aquatic organism. However, chemical monitoring of the lake by WRC in 2018 did not document any lead elevations. In addition, the Tonkin and Taylor report concluded that the results are of limited use in predicting the water quality going forward considering the volume yet to fill.
- 7.5.4.3 Therefore, the risk to aquatic organism at the site is considered to be **LOW**.

## 8.0 CONCLUSION AND RECOMMENDATIONS

### 8.1 Conclusion

- 8.1.1 The purpose of this investigation was to determine if HAIL has occurred or is occurring at 239 East Mine Road, 96 Tawa Road, 0 Kimihia Road and 191 Kimihia Road, Huntly. The site is to be developed into a lake with associated recreational and commercial facilities and rural residential properties.
- 8.1.2 A desk top investigation by Guy Sowry of CSI comprising a review of: historical photos; consultation, literature review and a site walkover documents that the following HAIL has occurred: E5 - coal yard; E7- coal mine; F4 - motor vehicle workshop; F7 - service station; E1 - asbestos disposal; and H - gun club. Potential contaminants are considered to be PAH's, boron, arsenic, lead, metals and asbestos.
- 8.1.3 The CSM's identified a **medium** risk to development and maintenance workers as they may come into contact with PAH's and metals from the historical coal yard and motor vehicle workshops. The CSM's identified a **medium** risk to aquatic organisms with PAH's and metals from the motor vehicle workshop in the pit and lead from the gun club.
- 8.1.4 The comprehensive risk assessment identified a **LOW** risk to development workers and maintenance workers as the concentration of PAH's and metals will more than likely be below NES SGV's. The risk assessment identified a **LOW** risk to aquatic organism as lead concentrations will more than likely be present at concentrations 36 times higher than the recommend lead value however, lead was not identified as a contaminant of concern during chemical water monitoring by WRC in 2018.
- 8.1.5 Therefore, it is highly unlikely that there will be a risk to human health if the site is developed into a lake with associated commercial and recreational facilities and rural residential.

### 8.2 Recommendations

- 8.2.1 No further contaminated land investigations are required for this site.



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	FIGURE 1
	SITE LOCATION





<b>CSI</b> Contaminated Site Investigations 34 Brookfield Street Hamilton	239 EAST MINE ROAD
	FIGURE 2
	SITE LOCATION



# **CSI**

**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

96 TAWA ROAD

FIGURE 3

SITE LOCATION





**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

0 KIMIHIA ROAD

FIGURE 4

SITE LOCATION





<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	191 KIMIHIA ROAD
	FIGURE 5
	SITE LOCATION

CONCEPT MASTERPLAN

KEY

FARM BLOCK

- 1 RESIDENTIAL DEVELOPMENT PRECINCT - STANDARD DENSITY  
Already re-zoned Residential in Proposed DP (800 - 2,300m2 Lots)
- 2 SUSTAINABLE ENERGY  
Renewable Energy Solar Farm
- 3 MOUNTAIN BIKE ZONE  
Varied Skill Level Tracks Within Forestry Block
- 4 PLANT NURSERY  
On-site Eco Sourced Plant Propagation & Commercial Supply
- 5 NATIVE & EXOTIC VEGETATION  
Carbon Credit Forestry, Wildlife Habitat, Slope Stabilisation
- 6 NATIVE WETLAND RESTORATION  
Wildlife Habitat Restoration, Improve Water Quality
- 7 CONTINGED FARMING  
Drystock Grazing & Forestry Practices Continue Around New Activities

MINE SITE

- 8 RECREATION LAKE  
Non-Potential Related Activities
- 9 HABITAT RESTORATION  
Wetlands, Lakes and Stream
- 10 BOAT RAMP & AQUATIC HUB  
Incl. Trailer Parking, Jetty, Aquatic Equipment Hire Centre
- 11 COMMUNITY CENTRE ACTIVITY HUB  
Multi-Purpose Building With Cafe, Conference Rooms & Teaching Spaces
- 12 COAL MINING MUSEUM  
Re-purposed Historic Huntly Railway Station, Incl. Outdoor Sculpture Trail
- 13 ACCOMMODATION  
Motel Units, Dormitories & Camping Facilities
- 14 FLEXIBLE OUTDOOR EDUCATION ZONES  
Ecological, Experiential & Educational Spaces and Walkways
- 15 OUTDOOR RECREATION  
Beaches & Lakeshore Tracks
- 16 PASSIVE RECREATION  
Multi-Purpose Open Space
- 17 CULTURAL DISCOVERY  
Nature & Heritage Trails with Interpretation & Education Opportunities
- 18 LAKE OUTLET CHANNEL  
Discharging Clean Overflow to Rannoch Lake Kinloch

NORTH NEXUS DESIGN LAKES DEVELOPMENT MASTERPLAN  
20



CSI

Contaminated Site Investigations  
34 Brookfield Street  
Hamilton

PROPOSED DEVELOPMENT

FIGURE 6

SITE LOCATION

## CONCEPT MASTERPLAN (HUB)

### KEY

- 1 NEW KIMSHA LAKE (RECREATION LAKE)  
Non-Fluvial/Retained Activities
- 2 POWER SUBSTATION  
Existing On-site Infrastructure
- 3 BOAT RAMP & JETTY FACILITIES  
Incl. Vessel Trailer Parking & Stopped Jetty
- 4 AQUATIC EQUIPMENT HIRE CENTRE  
Incl. Space for Equipment & Training
- 5 COMMUNITY CENTRE ACTIVITY HUB  
Multi-Purpose Building with Cafe, Conference Rooms & Teaching Spaces
- 6 COAL MINING MUSEUM  
Re-purposed Historic Hurty Railway Station, Incl. Outdoor Sculpture Park
- 7 COAL MINING OUTDOOR SCULPTURE PARK  
Re-purposed Large Historic Mining & Rail Equipment & Machinery
- 8 ACCOMMODATION  
Entrance & Office Reception (Re-purposed Weighbridge Station)
- 9 ACCOMMODATION  
Dormitories (x3 Wings of 25 Beds Each)
- 10 ACCOMMODATION  
Camping Facilities (50+ sites, Ablutions & Kitchen Annex, Shared Space)
- 11 ACCOMMODATION  
Motel Units (x3 Duplex Units - 6 Units Total)
- 12 FLEXIBLE OUTDOOR EDUCATION ZONES  
Ecological, Experiential & Educational Spaces and Walkways
- 13 PREMIER LAKE FRONT AMENITIES  
Beaches, Manicured Lawn, Tracks, Sports Jetty, Destination Playground
- 14 PASSIVE RECREATION  
Multi-Purpose Open Space
- 15 CULTURAL & NATURE DISCOVERY  
Nature & Heritage Trails with Interpretation & Education Opportunities
- 16 SUSTAINABLE ENERGY  
Renewable Energy Solar Farm
- 17 PLANT NURSERY  
On-site Eco Sourced Plant Propagation & Commercial Supply
- 18 HABITAT RESTORATION  
Gully & Slope Stabilisation with Native Shrubland Plantings
- 19 HABITAT RESTORATION  
Wetlands, Streams & Lake Margins with Native Riparian Plantings
- 20 CONTINUED FARMING  
Drystock Grazing & Forestry Practices Continue Around New Activities

NORTH ARROW | KIMSHA LAKE DEVELOPMENT MASTERPLAN  
01



**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

PROPOSED DEVELOPMENT

FIGURE

SITE LOCATION

## APPENDIX A

### REPORT CONDITIONS

*This report is prepared solely for the benefit of Kimihia Lakes Community Charitable Trust and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.*

*This report refers, with the limitations stated, to the conditions of site at the time of the investigation. No warranty is given as to the possibility of future changes in the condition of the site.*

*This report is based on aerial photos, anecdotal information and a site walkover. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research.*

*Whilst the findings detailed in this report reflect our best assessment, we are unable to give categoric assurances that they will be accepted by regulatory authorities without questions as such authorities may have unpublished more stringent objectives. This report is prepared and written for the proposed uses stated in the report and should not be used in a different context without reference to CSI. In time approved practices or amended legislation may necessitate a re-assessment.*

*The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspects especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report. If migrating pollution or contaminants (past or present) exists further research will be required before the effects can be better determined.*

## **APPENDIX B**

### **AERIAL PHOTOS**





<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK01
	1943

**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

239 EAST MINE ROAD AND FARM

SK02

1963



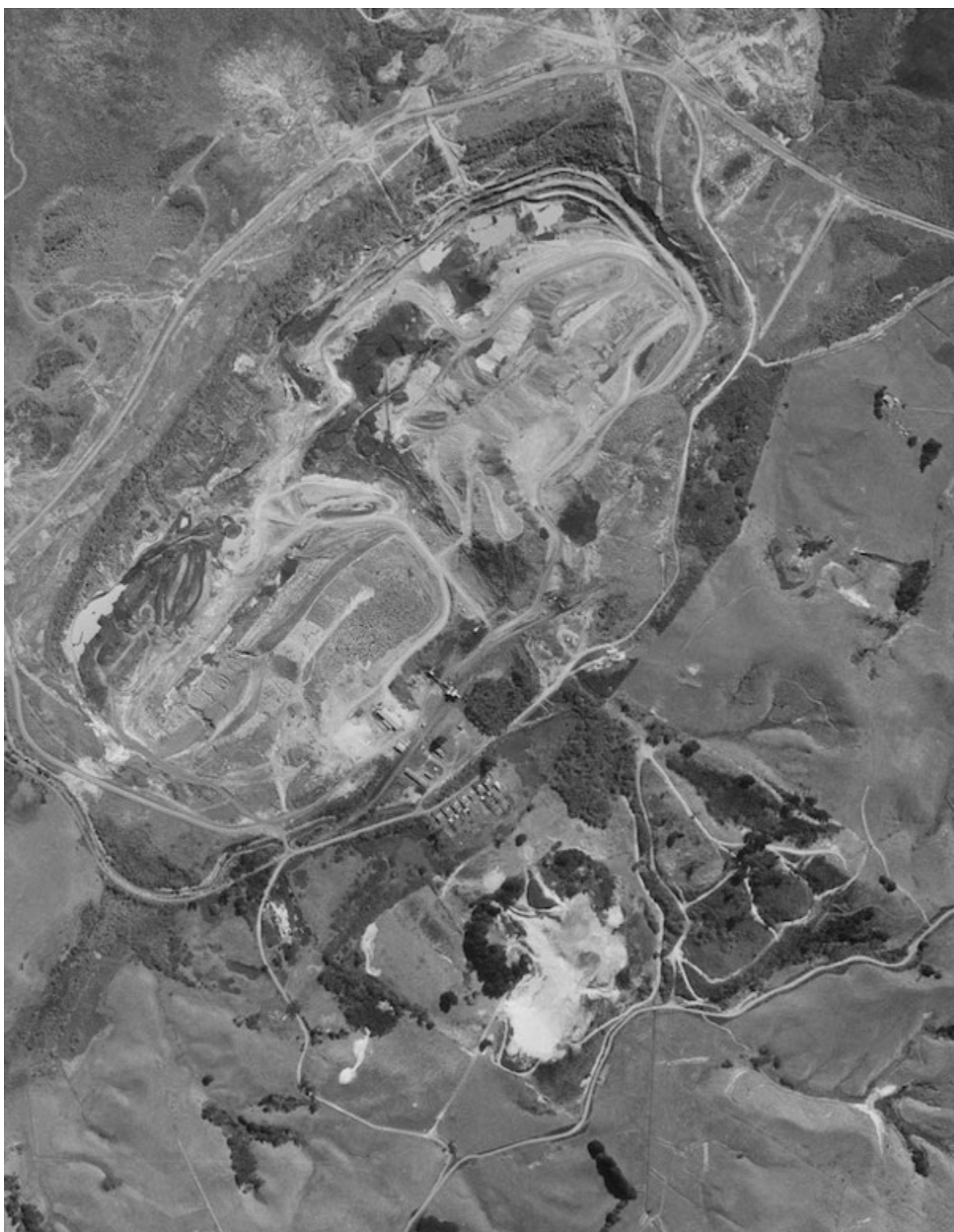


<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK03
	1966



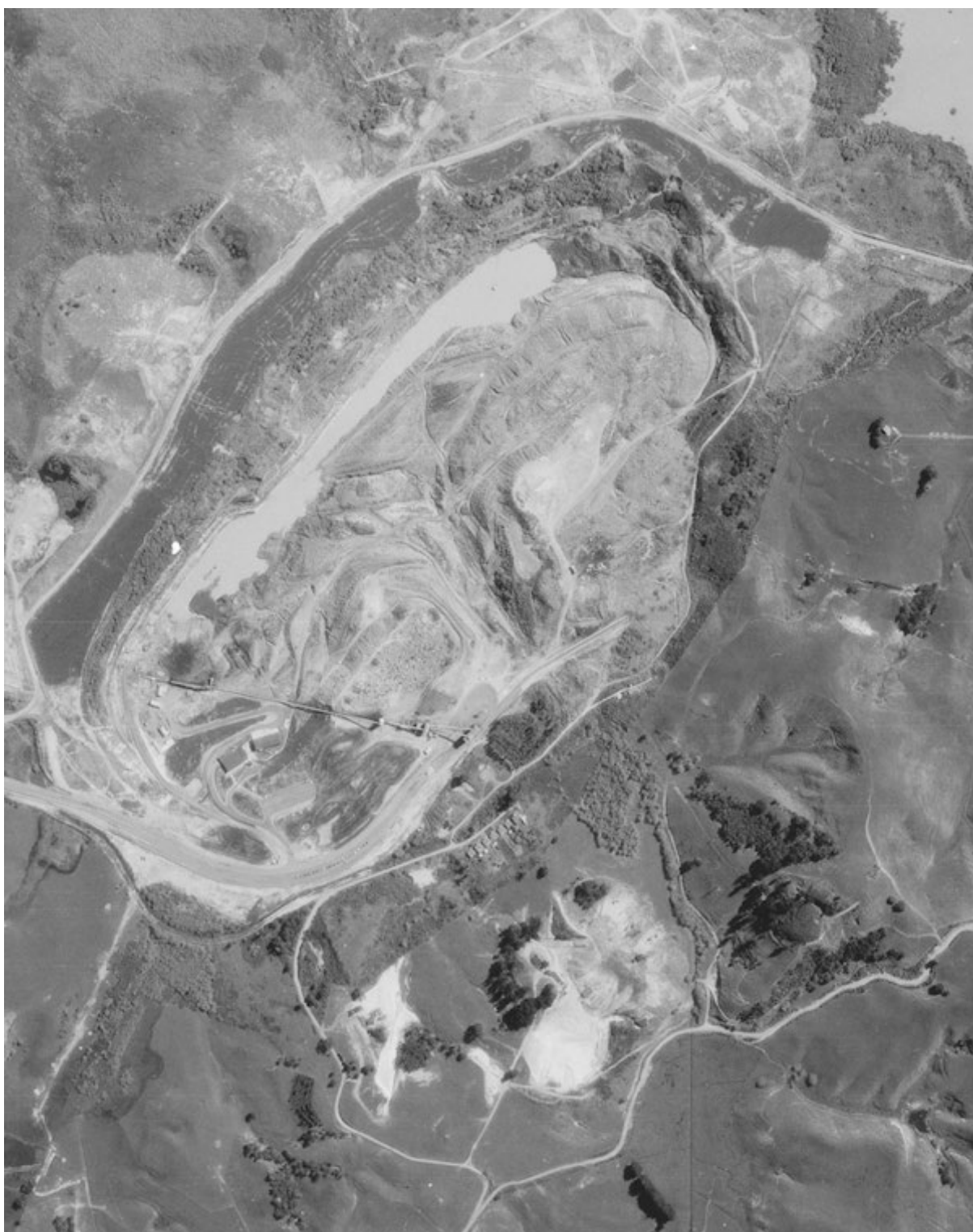


<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK04
	1969



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK05
	1973





<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK06
	1979

**CSI**

**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

239 EAST MINE ROAD AND FARM

SK07

1984

**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

239 EAST MINE ROAD AND FARM

SK08

1991



**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

239 EAST MINE ROAD AND FARM

SK09

1995

**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

239 EAST MINE ROAD AND FARM

2008

SK10



**CSI**

**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

239 EAST MINE ROAD AND FARM

SK11

2016



**CSI**

**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

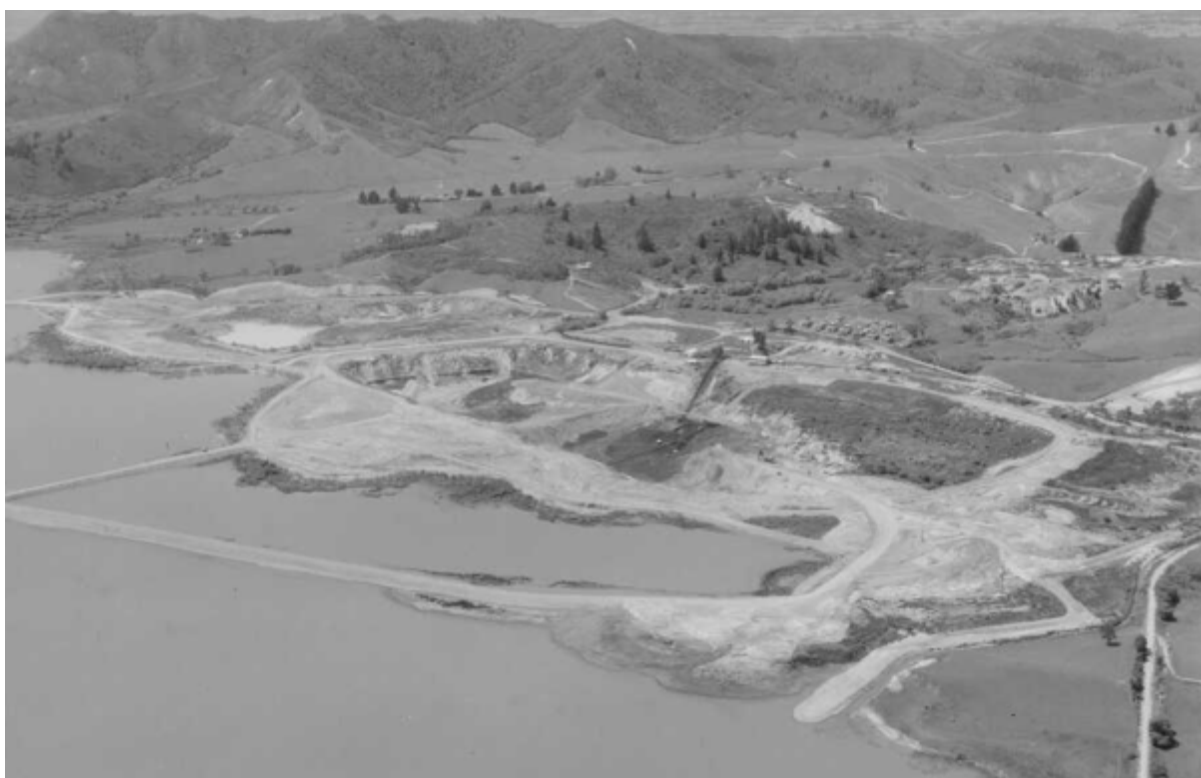
239 EAST MINE ROAD AND FARM

SK12

2010

## APPENDIX B

### AERIAL PHOTOS



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK13
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-36078-F
	1954

**CSI**

**Contaminated Site Investigations  
34 Brookfield Street  
Hamilton**

239 EAST MINE ROAD AND FARM

SK14

SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION  
WA-46197

1958





<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK15
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-49203
	1959



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK16
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-49204
	1959



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK17
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-62358-G
	1964



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK18
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-66542-G
	1966



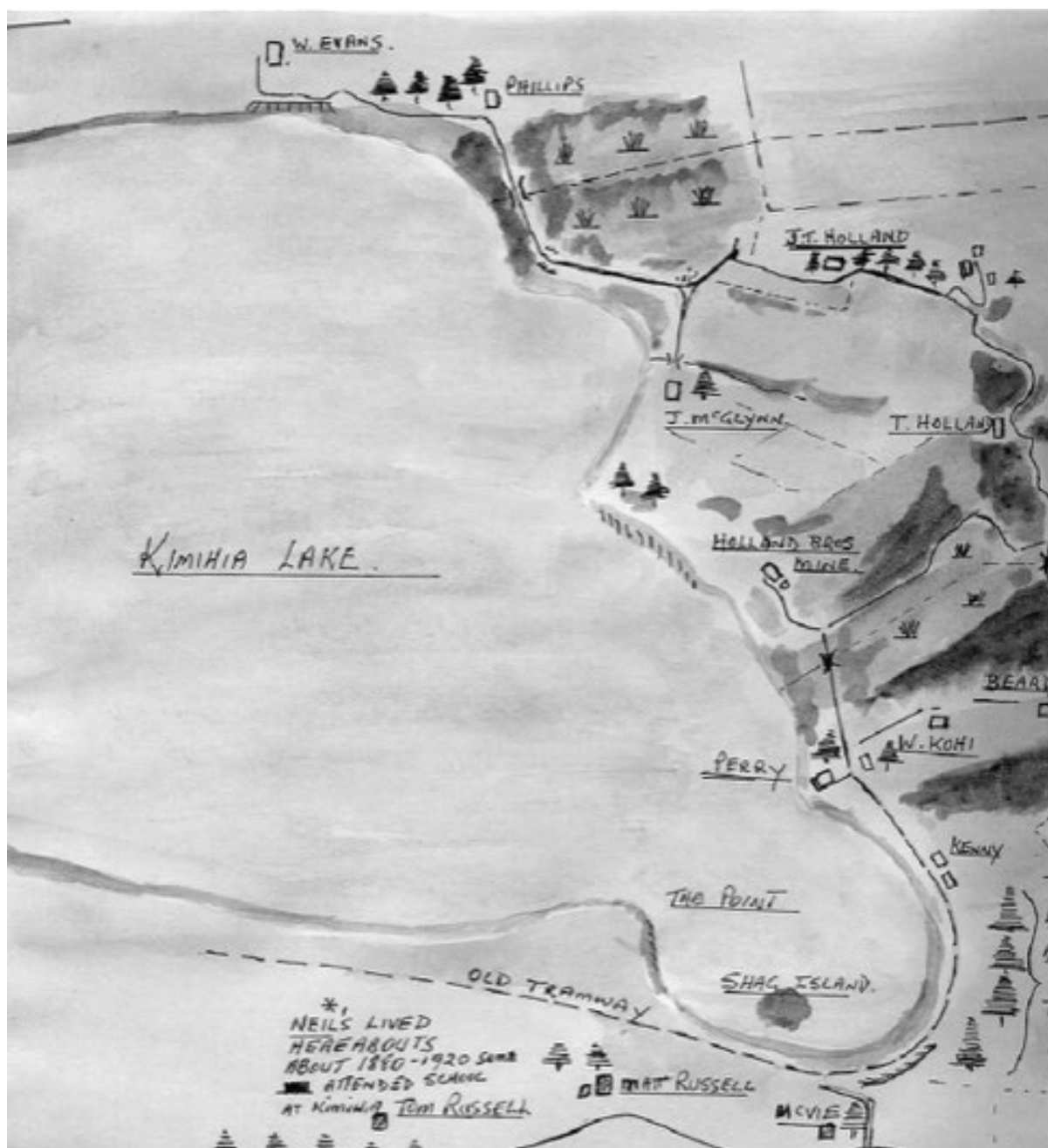


<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK18
	SOURCE: WHITES AVIATION ALEX TURNBULL COLLECTION WA-68894-G
	1970

**APPENDIX D****THE FIRST 100 YEARS, KIMIHIA SCHOOL, 1987 TO 1997  
EXTRACTS AND PHOTOS**



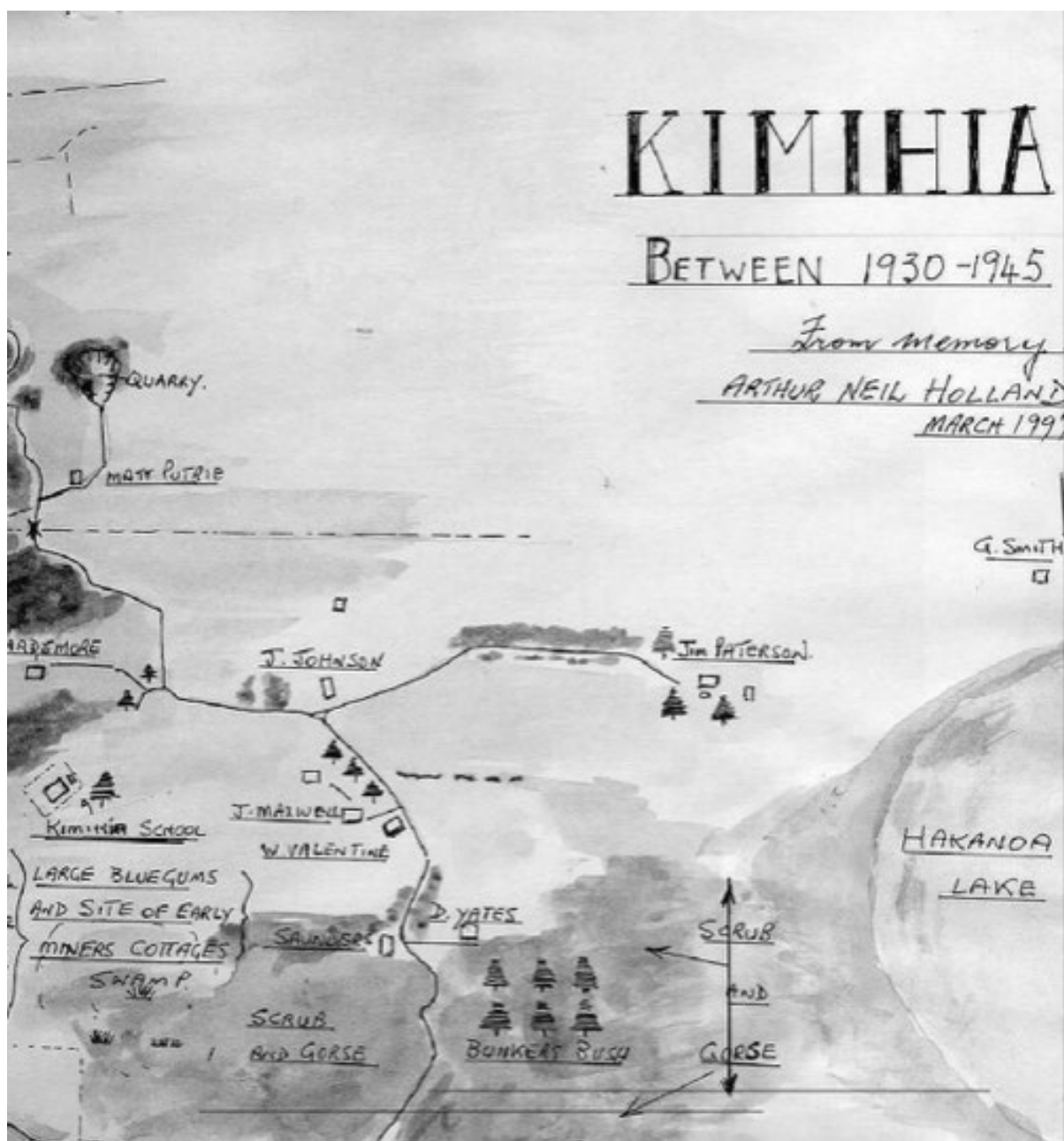
<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK20



**CSI**  
**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

239 EAST MINE ROAD AND FARM

SK21



**CSI**  
**Contaminated Site Investigations**  
**34 Brookfield Street**  
**Hamilton**

239 EAST MINE ROAD AND FARM

SK21



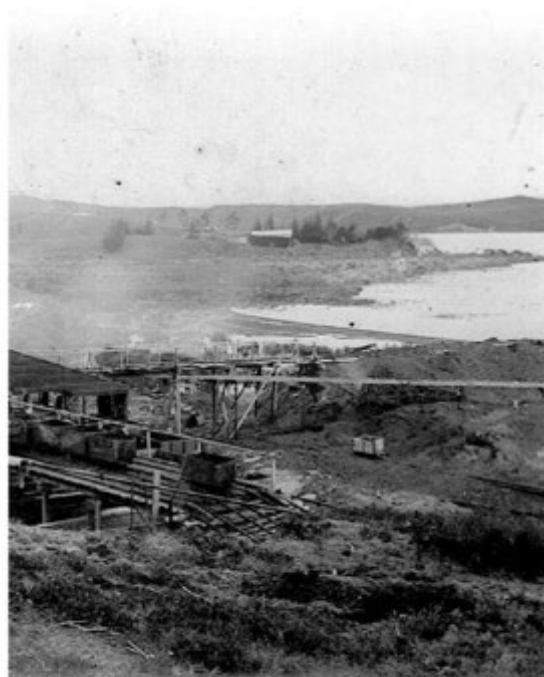


Looking south across the old Kimihia school site, August 1991.

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK22



The Tupper Reservoir Mine (Hibbard's Mine) viewed in 1905 looking to the west.



<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK23



A 1950s panoramic view from the southern lip of the open-cast pit showing the workshops to the left and the bins to the right.  
The administration offices were just past the tree out of shot to the left.

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK24



The main workshop viewed through the trestle supports for the conveyor belt which brought the coal up from the pit.

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK25
	1984



*Workshop #2 on the rim of the pit.*

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK26





The 120-B electric excavator being viewed by Alexander MacDonald, father of one of the operators Harry MacDonald. During all operations around the machine care had to be taken that the very high voltage cable feeding the several motors were protected. During the repositioning of the 120-B the cable was hefted by hand. An interruption to the power flow would render the machine useless. At one point a second 120-B was added to the mine to increase the removal of overburden. The operating noise within the cab as the various motors spun up and down affected the operators hearing over a period of time. It was not a usual practice for ear-muffs to be worn. The cab had to be rotated so that the steps were above the tracks before access and exit of the operator. A large tonnage of weights were placed at the back of the cab to counterbalance the action of the bucket on the front arm.

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK27



Kmihi mine 1996.

<b>CSI</b> <b>Contaminated Site Investigations</b> <b>34 Brookfield Street</b> <b>Hamilton</b>	239 EAST MINE ROAD AND FARM
	SK28

## APPENDIX E

### SITE WALKOVER PHOTOS



**LAKE**



**EX PIT WORKSHOP PAD**





**EX LOCATION OF SERVICE STATION**



**FLAT LAND ON RIM – EX COAL YARD**





**LOCATION OF HISTORIC WORKSHOP ON THE RIM**



**EX LOCATION OF HOPPER AND RAILWAY YARD**



**LOCATION OF HISTORIC VILLAGE**



**ON SITE DRAIN**