REPORT

Tonkin+Taylor

Assessment of Effects on the Environment

Glenbrook Steel Mill Air Discharge Permit Replacement

Prepared for
New Zealand Steel Limited
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Glossary

Term	Definition
Acid Regeneration Plant (ARP)	Ancillary plant associated with the Pickle Line in which spent acid is regenerated through roasting for re-use. This plant is a facility within the Finishing Plant
Air-borne contaminants	General term used in reference to emissions to air, with potential to cause harm or nuisance, beyond the Site boundary
Air discharge permits	Particularly refers to two of the resource consents required for the operation of the Steel Mill and its ancillary activities which are due to expire and are sought to be replaced. These are the "Main Air Permit" and the "Commercial Iron Plating Air Permit".
Ambient air monitoring	Measurement of concentrations of contaminants of interest present in the air, as captured by specific monitoring equipment. May measure fine fraction (PM_{10} or less), TSP or other air-borne contaminants.
Ancillary activities	Supporting activities, including movement of molten iron and steel slabs between manufacturing plants; stockpiling and processing of raw materials, co-products and waste; tipping of slag, iron and RPCC; and all supporting vehicle movements.
Annealing	Annealing restores the ductile properties of the steel strip (through heating and cooling), which is hard and brittle after cold rolling. This process is part of the Rolling Mills.
Best Practicable Option (BPO)	Defined in section 2(1) of the RMA, as: "in relation to a discharge of a practicable contaminant or an emission of noise, means the best method for option preventing or minimising the adverse effects on the environment having regard, among other things, to — (a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and (b) the financial implications, and the effects on the environment, of that option when compared with other options; and (c) the current state of technical knowledge and the likelihood that the option can be successfully applied."
Billet Caster	Four strand copper mould machine produces billets for further processing off site at Pacific Steel in Otahuhu, where they are manufactured into rod wire and bar.
CALPUFF model	The California Puff (CALPUFF) model is an advanced non-steady state, Lagrangian puff air dispersion model.
Carbon monoxide	A common and deadly poison with no taste, no smell, does not irritate your nose, mouth or skin. It can cause acute poisoning, with coma and eventually collapse occurring.
Char	Partially burned coal produced at the Kilns, a component of RPCC.
Cold Strip Mill	Further reduces the strip thickness and imparts a higher quality finish than is possible in the Hot Strip Mill.
Combination Mill	Similar to the Reversing Mill, that cold rolls pickled coils to the required thickness for annealing and then temper rolls the annealed coil to customer requirements. This process is part of the Rolling Mills.

Commercial Iron Plating Air Permit	A separate permit that was granted on 8 October 2020, which authorises discharges to air from commercial iron plating (Auckland Council reference DIS60363772).
Contaminant	Defined in section 2(1) of the RMA, as: "including any substance (including gases, odorous compounds, liquids, solids, and micro— organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat— (a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or (b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical or biological condition of the land or air onto or into which it is discharged."
Existing Consents	Permit 14317 (DIS60266277) which authorises the main air discharges for the Steel Mill operation and Permit DIS60363772 which authorises commercial iron plating activities. Both of which are due to expire on 1 November 2021. Referred to herein individually as the 'Main Air Permit' and the 'Commercial Iron Plating Air Permit', respectively.
Finish Line	The process equipment in the Paint Line where finish coatings (as opposed to primer coating) are applied to the steel coil.
Finishing Plants	Where NZ Steel processes the steel produced at Steel Plant into rolled steel, coated roofing iron and other steel products. The Finishing Plant consists of the Metal Coating Line and Paint Line (and formerly the Pipe Plant/Hollow Sections).
Fugitive emissions	Diffuse emissions to air, also referred to as non-point source discharges.
Ground level concentration (GLC)	The concentration in air of a pollutant to which a human being is normally exposed, typically taken to be between the ground and a height of some 2 metres above ground.
Hot Strip Mill	Processes slabs from the Steel Plant into hot rolled coils and plate for further processing. This process is part of the Rolling Mills.
Iron Plant	Where NZ Steel manufactures molten iron from the raw materials such as Primary Concentrate, coal and lime. This plant includes the MHF, Kilns, Melters and Cogeneration facilities.
Investigation Trigger Level	The Main Air Permit specifies a 24-hour average concentration of TSP or PM_{10} referred to by NZ Steel as the Investigation Trigger Level. If ambient concentrations measured at a continuous monitoring station established under the Main Air Permit exceed this level, NZ Steel will investigate the cause of the exceedance. If the cause is determined to be attributable to NZ Steel's activities, action shall be taken to reduce the discharge from the activity.
Klockner Oxygen Blown Maxhutte (KOBM)/ Oxygen Steel Making Furnace	Vessel within which molten iron and scrap steel is turned into liquid steel.
Ladle Metallurgical Furnace (LMF)	Similar to the ladle treatment stations, produces alumina free steel for use at the Billet Caster. Additional heat is supplied by electricity. The LMF is in the Steel Plant.
Ladle Treatment Stations (LTS)	A station where ferro-alloy additions are made to the ladle of steel to bring the steel to composition required for slab casting. The LTS is in the Steel Plant.

Main Air Permit	The "main" air discharge permit, which was granted on 29 November 2006 and authorises discharges to air from the production of iron and steel and associated activities (Auckland Council reference DIS80296529 [NRSI-14317])
Material Recovery Plant	Where NZ Steel subsidiary Steelserv Limited process co-product/slag from the iron and steelmaking process to produce aggregates. Processing involves crushing and screening.
Metal Coating Line (MCL)	The line cleans, anneals, coats and surface treats the steel in a continuous operation.
Millscale	Iron oxide generated on the surface of the steel during cooling of slabs. This is removed in the Rolling Mills (and can be reused as a process additive for some steel products).
Multi-hearth furnace (MHF)	The first process in the Iron Plant, which raises the temperature of the raw materials (primary concentrate and coal) to 900°C and removes volatile compounds from the coal.
Nitrogen dioxide and oxides of nitrogen	A reddish-brown, pungent, acidic gas that is strongly oxidising and corrosive. Exposure to nitrogen oxides has the potential to cause effects on lung functions, airway responsiveness, and increase reactivity to allergens, particularly in children.
Operational Area	Area within the wider NZS landholdings that is used for Steel Mill operations. This area does not include areas that are farmed, or the area currently used as a landfill for waste materials generated at the Site.
Paint Line	The Paint Line applies paint or laminate to coils of hot-dipped galvanised, Zincalume® and cold rolled steel in continuous coil-to-coil operation to produce Colorsteel®. (Formerly referred to as the Coil Coating Line.)
Particulate Matter/ Total suspended particulate (TSP)	Mixture of solid particles and liquid droplets found in the air, ranging in diameter from 10 to 50 µm (microns). Reference to fine particulates which can be inhaled are 10 microns or less (PM_{10}) and 2.5 micron or less ($PM_{2.5}$).
Pickle Line	A series of pickling tanks containing hydrochloric acid solutions and wash water that removes the fine layer of iron oxide scale that is generated during hot rolling and produces a strip surface suitable for cold rolling. This process is part of the Rolling Mills.
Plating/Iron Plating	Process whereby molten iron is poured into pits to solidify.
Point source	A point source is an identifiable stationary source of air pollution that emits air contaminants through a stack or vent.
Point source emissions	Emissions from stacks and chimneys, so not diffuse like fugitive (non-point source) emissions.
Polycyclic Aromatic Hydrocarbons (PAHs)	Compounds consist of only carbon and hydrogen atoms.
Primary concentrate (PC)	Iron sand (from the west coast of the North Island) that has been through a separation processes (magnetic/gravity) to increase the iron content/reduce any mineral impurities.
Primary Plants/Operations	Consists of the Iron Plant, Steel Plant and associated raw material handling. The MHF and Kilns Cogeneration facilities are also closely associated with these facilities.

Prime Line	The process equipment in the Paint Line where primer coatings are applied to the steel coil. Discharges from this process are via the Prime Oven Incinerator Stack.
Receiving Environment	The environment that would exist without the activities and associated effects authorised by the expiring consents (i.e., removing the effects that arise as a result of current operations).
Recoil Line	Processes coil by uncoiling and removing off-gauge material, side trimming, slitting to width for customer requirements, inspecting, oiling and recoiling. This process is part of the Rolling Mills.
Reduced Primary Concentrate and Char (RPCC)	The Kilns convert pre-heated primary concentrate and char mixture from the MHFs to metallic iron by chemical reduction to produce RPCC. RPCC is then discharged from the Kilns to closed transfer vessels for delivery to the Melters. Note RPCC consists of: prime RPCC, which is RPCC that meets the specification for further processing at the Melters; off-specification RPCC, which is RPCC that does not contain sufficient iron content for further processing; and accretion RPCC, which is a boulder-like build up that must be removed from the Kilns.
Rolling Mills	Consists of the hot and cold strip mills, which process steel slab into coil.
Roughing Mill	Reversing mill with attached edger that flattens the steel slab to between 18mm and 32mm and coils. This process is part of the Rolling Mills.
Reversing Mill	Reduces the gauge of the coil by passing it through the reversing mill in one direction, recoiling, and then passing it through the mill in the reverse direction. Between five and seven passes are made. This process is part of the Rolling Mills.
Scrubber	Scrubber systems are air pollution control devices that remove particulates and/or gases from industrial exhaust streams. Wet scrubbers refer to the removal of such particulates and or gases through the application of a scrubbing solution.
Sensitive receptor	Locations where people may be present all times of the day, both indoors and outdoors and may include people of high sensitivity (such as children and the elderly). Sensitive land uses include, but are not limited to, hospitals, schools, childcare facilities, rest homes, marae, residential dwellings and recreation spaces.
Shear Line	Receives cold rolled, annealed and temper rolled coil which it levels, cuts to length, oils, piles and packs for dispatch as flat sheet
Site	All NZ Steel landholdings in relation to the Steel Mill at Glenbrook, which includes the Steel Mill, industrial landfills and farming activities (Records of Title provided at **Appendix C**).
Skin Pass Mill	Hot rolled coils are processed to correct shape and improve surface finish. Export coils get sprayed with oil to prevent rust. This process is part of the Rolling Mills.
Slab Reheating Furnace	First stage of the hot mill process. Raises the temperature of slabs using a natural gas fuelled furnace. This process is part of the Rolling Mills.
Slag	A co-product of the iron and steel making process that is similar in character to volcanic rock. Slag is a mixture of non-metallic and

	metallic materials that float on top of the molten iron or steel (removing impurities such as silicon, titanium and sulphur). Melter Slag is a co-product of the iron making process, that is similar in character to volcanic rock. KOBM Slag is a co-product of the steel making process, formed in the KOBM. It has cementitious properties and is used to partly replace limestone on Site. Vanadium Slag is a co-product of the steel making process, formed after oxygen is blown into a ladle of molten iron at the VRU. Steelmaking Slag means both KOBM Slag and Vanadium Slag.
Stack emission testing	Measurement of emissions to air exiting a stack, chimney or vent.
Steel Mill	The integrated steel making facility in Glenbrook and ancillary activities on the Site.
Steel Plant	Where NZ Steel manufactures steel slabs and billets made from iron produced at the Iron Plant.
Steelserv Limited	Company that operates large mobile equipment on Site and provides a range of services, including stockpiling and handling of coal, movement of iron lades to the steel plant, slag ladles and bins to the tipping banks, waste and co-products to processing areas. Steelserv also operates the Site landfill and the screening and crushing facilities for production of a range of slag products for direct sale.
Sulphur dioxide	A colourless, soluble gas with a characteristic pungent smell. It could pose a risk to human health because if inhaled, it can be a potent respiratory irritant.
Vanadium	A high-value metallic co-product entrained in slag.
Vanadium Recovery Unit (VRU)	Produces a vanadium rich slag from molten iron prior to steel making in the KOBM.
Waiuku Estuary	The Steel Mill is located on the Eastern bank of the Waiuku River, which, despites its name, is a long and relatively narrow tidal arm (estuary) of the Manukau Harbour. For the avoidance of confusion, the term “Waiuku Estuary” is therefore used in this report to describe this area.
Works debris	A collective term for the debris that can be recovered from around the Site, including the ‘skulls’ (solidified metal that forms on the top of the molten metal in the ladles) and material that is chipped out of the ladles, metal deposits from the floors of the Iron and Steel Plan areas, refractory bricks that are in the KOBM and VRU areas, and other metallic waste materials.

Abbreviations

Abbreviation	Term
AAAQT	Auckland Ambient Air Quality Targets
AAQG	The National Ambient Air Quality Guidelines
AEE	Assessment of Effects on the Environment
ANZECC	Australia and New Zealand Environment and Conservation Council
AP2050	Auckland Plan 2050
AQA	Air Quality Assessment
AQMP	Air Quality Management Plan
ARP	Acid Regeneration Plant
ARPHS	Auckland Regional Public Health Service
ASU	Air Separation Unit
AUP	Auckland Unitary Plan – Operative in part
BAT	Best Available Technique
BERL	Business and Economic Research Limited
BPO	Best Practicable Option
CA OEHHA	California Office of Environmental Health Hazard Assessment
Cl_2	Chloride
CHI	Cultural Heritage Inventory
CMA	Coastal Marine Area
CMT	Customary Marine Title
CO	Carbon monoxide
CO_2	Carbon dioxide
Council	Auckland Council
DOC	Department of Conservation
DWSNZ	Drinking Water Standards for New Zealand 2005
EMS	Environmental Management System
FIDOL assessment	Frequency, Intensity, Duration, Offensiveness/character, Location Assessment
GDP	Gross Domestic Product
GLC	Ground Level Concentration
GPG Industry	Good Practice Guide for Assessing Discharges to Air from Industry
HCl	Hydrochloric acid (solution) or hydrogen chloride (when emitted to air)
IMP	Iwi Management Plan
IMS	Integrated Management System
KOBM	Klockner Oxygen Blown Maxhutte
LMF	Ladle Metallurgical Furnace
LTS	Ladle Treatment Stations
MACA	Marine and Coastal Area (Takutai Moana) Act 2011
MAV	Maximum Allowable Value

MCL	Metal Coating Line
MHF	Multi-hearth furnace
NESAQ	National Environmental Standards for Air Quality Regulations 2004
NES Drinking Water	National Environmental Standard for Sources of Human Drinking Water
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPSFM	National Policy Statement for Freshwater Management
NPSUD	National Policy Statement for Urban Development
NZCPS	New Zealand Coastal Policy Statement
NZ Steel	New Zealand Steel Limited
ONC	Outstanding Natural Character
ONF	Outstanding Natural Feature
ONL	Outstanding Natural Landscape
PAH	Polycyclic aromatic hydrocarbon
PC	Primary Concentrate
PCB	Polychlorinated biphenyls
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofurans
PCR	Protected Customary Rights
$PM_{2.5}$	Particulate matter less than 2.5 microns in size
PM_{10}	Particulate matter less than 10 microns in size
RMA	Resource Management Act 1991
RMAA 2020	Resource Management Amendment Act 2020
RPCC	Reduced primary concentrate and char
RPS	Regional Policy Statement
SEA_T	Significant Ecological Area - Terrestrial
SO_2	Sulphur dioxide
SO_x	Sulphur oxides
SOE	State of the Environment
Steel Mill	Glenbrook Steel Mill
Steelserv	Steelserv Limited
TCEQ	Texas Commission on Environment Quality
The Kilns	Four Rotary Kilns
TSP	Total Suspended Particulate
US EPA	United States Environmental Protection Agency
UAS	Uni-flow Annealing System
VOC	Volatile organic compounds
VRU	Vanadium Recovery Unit
WHO	World Health Organisation

Executive summary

New Zealand Steel Limited (NZ Steel) currently holds two air discharge permits (Existing Consents)[1] for the Glenbrook Steel Mill (Steel Mill) located in South Auckland at 131 Mission Bush Road, Glenbrook, Auckland (Site). Both permits expire on 1 November 2021. NZ Steel is seeking replacement consents for the continuation of discharges associated with the operation of the Steel Mill in accordance with section 15 of the Resource Management Act 1991 (RMA) (the Proposal).

Resource consent is required as a Discretionary Activity and this Assessment of Effects on the Environment (AEE) has been prepared to support the application for resource consent. The application is not seeking to authorise any changes in the nature or scale of discharges to air from the Steel Mill compared to currently consented activities.

The Steel Mill is a fully integrated facility that converts iron sand and coal to produce steel slab, billets and a range of processed steel products. The Steel Mill has been operated at the Site since 1968. The Steel Mill comprises the:

- Iron Plant, which converts the raw materials, iron sand, lime and coal, to iron;
- Steel Plant, which converts the iron to steel and then into steel slab and billet;
- Rolling Mills, where the cast steel slab is rolled into coils for further processing or direct sale;
- Finishing Plants, where a range of metal-coated and painted products are produced; and
- Ancillary activities which include cogeneration facilities, handling and processing raw materials, co-products and waste.

The Steel Mill's existing air discharges are managed by the conditions of the Existing Consents and the NZ Steel's Environmental Management System.

The Steel Mill is a large and integrated industrial facility that manages the discharge of a range of contaminants to air, including:

- Particulate matter, consisting of Total Suspended Particulate (TSP) and particulate smaller than 10 micrograms (PM_{10}) and 2.5 micrograms ($PM_{2.5}$);
- Products of combustion, including sulphur oxides, nitrogen oxides and carbon monoxide;
- Metals;
- Trace emissions of polyaromatic hydrocarbons (PAHs) and dioxins;
- Hydrogen chloride and chlorine; and
- Volatile organic compounds.

A comprehensive Air Quality Assessment (AQA) has been undertaken and is provided at **Appendix F** to this AEE. The AQA discusses the types and magnitude of the discharges, how the air discharges are assessed (including the methods and criteria used to quantify the contaminant levels) and the actual and potential effects of the discharges continuing. The AQA also covers the management regime currently implemented on Site to control the discharges, which is proposed to continue as part of the Proposal, with updates to reflect the new consents and including improvements proposed to further mitigate discharges).

The potential adverse effects of the discharges that have been assessed as part of this application, include health effects (particularly linked to respiratory problems), nuisance effects, ecological effects, cultural effects and visual effects. Section 7 of this AEE provides an assessment of these effects and concludes that the actual and potential effects of the discharges can be appropriately

[1] Permit 14317 (DIS60266277) and Discharge Permit DIS60363772

managed and mitigated to an acceptable level via the employment of management systems (both currently operating and as proposed to by modified by the AQA).

Proposed conditions are provided as part of this application (**Appendix L**). The conditions seek to authorise NZ Steel's operations, while appropriately managing and minimising adverse effects to a practicable minimum. The draft conditions are largely based on the existing conditions of the Main Air Permit, with modifications proposed where considered appropriate based on the findings of this assessment and NZ Steel's expert advice.

The activities and air discharges are consistent with the zone and precinct which relate to the land use of the Steel Mill and the discharges are consistent with the objectives and policies of the Auckland Unitary Plan – Operative in part (AUP). Allowing the ongoing operation of the long-standing Steel Mill is important to the social and economic wellbeing of the people and community of Glenbrook, Auckland and New Zealand as a whole. The value of the investment NZ Steel has in the Steel Mill[2] is significant, with the replacement cost for the assets being $5.1 billion[3] (as discussed in the Economic Impact Assessment provided at **Appendix H**).

NZ Steel recognises that Mana Whenua have an ongoing and enduring relationship with the land and have an ongoing role as kaitiaki. NZ Steel has a longstanding relationship and practice of working with Mana Whenua to support and respect cultural values of the Site and wider area. As part of this application, cultural values of the Site have been identified via the consultation that has occurred as part of this replacement resource consent process (detailed in Section 10). NZ Steel will continue to engage with Mana Whenua and other stakeholders, following lodgement of this application, including through the existing NZ Steel Environment Committee (which comprises representatives from Ngāti Te Ata and Ngāti Tamaoho).

NZ Steel is also very cognisant of the role and position of the Steel Mill in the local community. It has strong community links including those fostered through the Environment Committee which also comprises representatives from the local Franklin Board and Auckland Public Health.

Overall, the Proposal gives effect to the purpose of the RMA in that it will allow for the continued use of the natural and physical resources of the Site as a result of the operation of the Steel Mill, which provides for social and economic wellbeing of the local community, the Auckland region and New Zealand as a whole.

[2] Relevant pursuant to section 104(2A), RMA.

[3] Based on NZ Steel's insured value.

Schedule 4 Requirements

Schedule 4 of the RMA sets out the information required in an application for a resource consent. All relevant matters required to be included have been addressed in the assessments and descriptions in this AEE. The following table provides a summary of the information required in Schedule 4 and a reference to its location in the AEE.

Schedule 4 - Information required	**Location within AEE**
A description of the activity	Section 3
A description of the site at which the activity is to occur	Section 2
The full name and address of each owner or occupier of the site	Section 1.3
A description of any other activities that are part of the proposal to which the application relates	Section 3
A description of any other resource consents required for the proposal to which the application relates	Section 5
An assessment of the activity against the matters set out in Part 2	Section 9.1.1
An assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b). This must include:	
• Any relevant objectives, policies, or rules in a document	Section 9
• Any relevant requirements, conditions, or permissions in any rules in a document	Section 5
• Any other relevant requirements in a document (for example, in a national environmental standard or other regulations)	Section 9
An assessment of the activity's effects on the environment that includes the following information:	
• If it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity.	Section 8
• An assessment of the actual or potential effect on the environment of the activity.	Section 7
• If the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use.	Section 7
• If the activity includes the discharge of any contaminant, a description of—	Sections 2, 3 and 8
• The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and	
• Any possible alternative methods of discharge, including discharge into any other receiving environment.	
• A description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect.	Section 4

Schedule 4 - Information required	Location within AEE
• Identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted.	Section 10
• If the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved.	Section 4
• If the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).	N/A, although customary right claims are addressed at Section 9.1.4
An assessment of the activity's effects on the environment that addresses the following matters:	
• Any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects.	Section 7
• Any physical effect on the locality, including any landscape and visual effects.	Section 7
• Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity.	Section 7
• Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations.	Section 7
• Any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants.	Section 3, 4 and 8
• Any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.	Section 7
For applications involving permitted activities	
If any permitted activity is part of the proposal to which the application relates, a description of the permitted activity that demonstrates that it complies with the requirements, conditions, and permissions for the permitted activity (so that a resource consent is not required for that activity under section 87A(1)).	Section 5
For applications affected by section 124 or 165ZH(1)(c)	
If the application is affected by section 124 or 165ZH(1)(c) (which relate to existing resource consents), an assessment of the value of the investment of the existing consent holder (for the purposes of section 104(2A)).	Section 9.1.7

1 Introduction

1.1 Overview

This Assessment of Effects on the Environment (AEE) has been prepared in accordance with section 88 of the Resource Management Act 1991 (RMA) on behalf of New Zealand Steel Limited (NZ Steel) to support a resource consent application to authorise air discharges associated with iron and steel production and ancillary activities of the Glenbrook Steel Mill (Steel Mill) in accordance with section 15 of the RMA (the Proposal). The relevant Auckland Council (Council) Application Forms are attached at **Appendix A**.

For clarity, the use of "Site" within the AEE and accompanying documentation refers to the entirety of the NZ Steel landholdings, located at 131 Mission Bush Road, Glenbrook, Auckland. The "Operational Area" refers to a smaller area within the Site that contains the operational area of the Steel Mill[4]. These areas are depicted on **Figure 1.1** and the figures in **Appendix E**. All the air discharges subject to this application are emitted from within the Operational Area.

The discharges to air from the Operational Area are from both point sources and non-point sources (fugitive emissions) associated with the Steel Mill's manufacturing processes and ancillary activities. Section 3 describes these processes and activities in further detail including their resulting contaminants and Section 4 describes the management and mitigation measures that are implemented to manage these air discharges.

The nature of the air discharge contaminants are principally comprised of:

- Particulate matter, including Total Suspended Particulate (TSP) and particulate smaller than 10 micrograms (PM_{10}) and 2.5 micrograms ($PM_{2.5}$);
- Products of combustion, including sulphur oxides (SO_x), nitrogen oxides (NO_x)and carbon monoxide (CO);
- Metals;
- Trace emissions of polyaromatic hydrocarbons (PAHs) and dioxins;
- Hydrogen chloride (HCl) and chlorine (Cl_2); and
- Volatile organic compounds (VOCs).

[4] The Main Air Permit refers to an 'Iron and Steel Zone' in a number of conditions as a way of identifying the Operational Area. The Iron and Steel Zone was reflective of the heavy industrial zoning extent prescribed by the former Franklin District Plan. The Iron and Steel Zone is no longer a useful reference as the former Franklin District Plan has been replaced by the AUP and the Heavy Industry Zone. The Heavy Industry Zone applies to a larger area than that occupied by the Operational Area and is therefore not useful for this purpose.

Figure 1.1: Aerial photograph of the Glenbrook Steel Mill

NZ Steel currently holds two Existing Consents (referred to herein individually as the 'Main Air Permit' and the 'Commercial Iron Plating Air Permit') for the Steel Mill, both of which expire on 1 November 2021. Details of these permits are contained in Section 1.5 below and copies of the Existing Consents are provided in **Appendix B**.

NZ Steel is seeking replacement consents for the continuation of the discharges that are authorised by these permits and is not seeking to authorise any increase or material change to the nature or scale of discharges to air from the Operational Area compared to currently consented activities[5].

This AEE is supported by a number of appendices:

- **Appendix A** – Application Forms
- **Appendix B** - Copies of existing air discharge permits (DIS80296529 and DIS60363772)
- **Appendix C** – Records of Title
- **Appendix D** – Auckland Unitary Plan - Operative in Part (AUP) Planning Maps
- **Appendix E** – Figures
- **Appendix F** – Air Quality Assessment
- **Appendix G** – Landscape and Visual Assessment
- **Appendix H** – Economic Impact Statement
- **Appendix I** – Mana Whenua Correspondence
- **Appendix J** – Consultation Records
- **Appendix K** – Objectives and Policies Assessment
- **Appendix L** – Proposed Conditions

1.2 Background

NZ Steel is the New Zealand-based subsidiary of Australasian company Bluescope Steel (Bluescope), producing steel slab, billets and a variety of processed steel products for domestic and export markets. NZ Steel also operates the Waikato North Head mine (which provides the ironsand for the Steel Mill) and Pacific Steel (which is a Rolling Mill located in Otahuhu that further processes products from the Steel Mill).

Commercial operations have been undertaken at the Site since 1968, with commencement of production from a continuous galvanising line with imported feed coil, construction and operation of a Pipe Mill from 1972 (which operated at the Site until 2020) and construction and operation of the Paint Line from 1982.

Major investment in the 1980s saw the commissioning of the existing ironmaking facilities (four Multi Hearth Furnaces (MHFs), four Kilns and two Melters), the Steel Plant continuous slab-casting facilities and the Rolling Mills. By 1987, NZ Steel was operating as a fully integrated Steel Mill, producing flat steel products predominantly for the domestic market. The continuous galvanising line (in the Metal Coating Line) was modified in 1994 to produce ZINCALUME®, in addition to GALVSTEEL®. In 1997, investment was made in a second and larger Cogeneration Plant to recover energy from the Iron Plant waste heat, which now provides around 60 percent of the Steel Mill's electricity requirements. In 2015 a billet caster was installed to produce billet for the NZ Steel facilities in Otahuhu (producing reinforcing rod and bar) and more recently its Fiji Rolling Mill facilities.

Today, the Steel Mill comprises the:

- Iron Plant, which converts the raw materials, ironsand, lime and coal, to iron;
- Steel Plant, which converts the iron to steel and then into steel slab and billet;
- Rolling Mills, where the cast steel slab is rolled into coils for further processing or direct sale;

[5] With the exception of the use of generators for alternate power supply for which consent is currently sought (discussed at Section 3.3.4).

- Finishing Plants, where a range of metal-coated and pre-painted products are produced; and
- Ancillary activities, including movement of iron and steel between manufacturing plants, transport, stockpiling and processing raw materials, co-products and waste.

Figure 3.1 provides a spatial overview of the locations of each of the key components of the Steel Mill.

Two separate commercial entities integral to the Steel Mill are Steelserv Limited (Steelserv) and Alinta ENZ Limited (Alinta Energy). These companies operate activities within the Operational Area as agents of NZ Steel.

Steelserv conducts a range of ancillary stockpiling and processing activities related to both raw materials, waste and co-products (including slag and other materials for re-use and recycling within the Steel Mill and for direct sale). Steelserv also operates a natural gas fired rotary kiln to dry ironsand, a metal recovery plant, mobile equipment for washing and screening co-products and an aggregate crusher/screening plant. Alinta Energy operates the two gas combustion Cogeneration plants at the Site, under the Main Air Permit.

Steelserv and Alinta's activities are inter-related with NZ Steel's operations and it is difficult to separate the effects of these activities from other discharges from the Operational Area. Therefore, the Proposal seeks to enable the continued operation of these activities as the Existing Consents do currently.

An Air Separation Unit (ASU) owned and operated by BOC Ltd is also located on NZ Steel owned land. The ASU supplies pipeline oxygen, nitrogen and argon to the Steel Mill, for use in the steel making process. As clarified in Section 1.5 below, this activity is authorised by a separate resource consent and is not within the scope of the current application to replace the Existing Consents.

1.3 Applicant and property details

Table 1.1 below provides an overview of the applicant and property details.

Table 1.1: Applicant and property details

Applicant	New Zealand Steel Limited
Owner and Occupier of application Site	New Zealand Steel Limited
Site address / map reference	35 Higgins Road; 36 Higgins Road; 72 Mission Bush Road; 64 Glenbrook Beach Road; 131 Mission Bush Road; 152 Brookside Road (Collectively known as 131 Mission Bush Road, Glenbrook, Auckland)
Site area	Approximately 550 hectares
Legal description	Lot 1 DP 20738; Lot 1 DP 27248; Lot 1 DP 146074; Lot 1 and 3 DP 29372; Lot 2 DP 29372; Lot 1 DP 110268; Lot 2 DP 110268; Lot 5 DP 102560; Lot 1-3 DP 202203, Allotment 363-364 Parish of Waiuku East; Allotment 285 Parish of Waiuku East; Lot 1 DP 62129; Middle Part Allotment 123 Parish of Waiuku East; Allotment 122 and Part Allotment 123 Parish of Waiuku East.
Record of Title reference	NA463/98; NA692/303; NA86C/596; NA727/169; NA730/133; NA62A/1003; NA62A/1004; NA56C/636; NA128C/529; NA907/240; NA19C/1494; NA700/127; NA285/12 Copies of the relevant Records of Title are attached in **Appendix C**.
Relevant Council	Auckland Council

Relevant Plans	Auckland Unitary Plan – Operative in Part (AUP) The relevant AUP planning maps are attached in **Appendix D**.
Address for service during consent processing	PO Box 5271, Victoria Street West, Auckland 1142 Attention: Jennifer Carvill Phone: +64 29 707 0975 Email: jcarvill@tonkintaylor.co.nz
Address for service during consent implementation and invoicing	131 Mission Bush Road, Glenbrook Attention: Environment Manager, Claire Jewell Phone: +64 21 615 080 Email: claire.jewell@bluescope.com

1.4 Overview of resource consent requirements

Overall, resource consent is sought from Council under the AUP and any other relevant planning documents, as a discretionary activity to discharge contaminants to air pursuant to section 15 of the RMA, for the following reasons:

- Discharge of contaminants to air associated with the recovery of HCl at the Acid Regeneration Plant pursuant to Rule E14.4.1(A22) as a discretionary activity.
- Discharge of contaminants to air associated with any other chemical processes that results in discharges to air pursuant to Rule E14.4.1(A29) as a discretionary activity.
- Discharge of contaminants to air associated with the production of molten iron from Primary Concentrate (ironsand) pursuant to Rule E14.4.1(A40) as a discretionary activity.
- Discharge of contaminants to air associated with the manufacture of steel and steel alloys pursuant to Rule E14.4.1(A41) as a discretionary activity.
- Discharge to air from the melting of metal and metal alloy pursuant to Rule E14.4.1(A42) as a discretionary activity.
- Discharges to air from galvanising processes pursuant to Rule E14.4.1(A43) as a discretionary activity.
- Discharges to air from combustion sources pursuant to Rule E14.4.1(A54) as a discretionary activity.
- Discharges to air from flaring activities occurring at the Melter and KOBM flarestacks pursuant to Rule E14.4.1(A57) as a discretionary activity.
- Discharges to air from the drying of solvent-based paints at the Paint Line where discharges pass through an afterburner pursuant to Rule E14.4.1(A62) as a restricted discretionary activity.
- Discharges to air from the outdoor storage of more than 500 tonnes of coal or coal products pursuant to Rule E14.4.1(A81) as a discretionary activity.
- Discharges to air from crushing of ore and aggregates through the processing of co-products (slag processing) pursuant to Rule E14.4.1(A94) as a discretionary activity.
- Any other direct or indirect, point source or fugitive discharges of contaminants to air associated with the operation of the Steel Mill and ancillary or related activities in the Operational Area.

For the avoidance of doubt, NZ Steel is seeking resource consent under the rules identified above, together with any other air consents necessary to authorise the activities described in the application, whether currently regulated or regulated in the future as a result of future plan changes (including to give effect to national direction) as well as any future national environmental standards.

1.5 Existing resource consents

NZ Steel holds a suite of resource consents required for the operation of the Steel Mill. The following two consents are of particular relevance to air discharges, as they are the consents due to expire and for which replacement is sought:

- "Main Air Permit" - Discharge Permit 14317 (DIS60266277) – this permit authorises a number of point source and fugitive discharges as part of the Steel Mill operations (as described in detail in Section 3). This permit is due to expire on 1 November 2021.
- "Commercial Iron Plating Air Permit" - Discharge Permit DIS60363772 - this permit authorises commercial iron plating activities up to 500 tonnes per day in addition to the plating activities authorised by Permit 14317. This permit is also due to expire on 1 November 2021 and this application seeks a replacement consent for those discharges.

This application seeks replacement consents for all discharges authorised under the Main Air Permit and the Commercial Iron Plating Air Permit.

It is noted that the Main Air Permit and Commercial Iron Plating Air Permit both apply to the full extent of the Site[6] as shown in **Figure 2.1** (and those contained at **Appendix E**).

Other air discharge permits relevant to the Site which do not form part of this application but have been considered with respect to cumulative effects include:

- NZ Steel's Discharge permit DIS60266277 - discharges to air (principally dust) from landfilling activities associated with the onsite private landfill. This consent expires in 2044[7].
- BOC Gas' Discharge permit DIS60265868 – discharges to air from an air separator unit (for the manufacture of gas on Site), which involves the discharge of hydrogen, oxygen, nitrogen, and argon into the atmosphere. This consent expires in 2032.

1.6 Consent duration

Pursuant to section 123 of the RMA, resource consent is sought for a duration of 35 years. This is the maximum permissible duration enabled by the RMA and is considered appropriate given:

- The scale of the investment in the Steel Mill. For example, the replacement cost for the assets (and NZ Steel's insured value) is $5.1 billion. Together with NZ Steel's related businesses and assets associated with the Waikato North Head Mine and Pacific Steel, and the considerable costs associated with the ongoing maintenance and operation of the Steel Mill (discussed further at Section 9.1.3), this represents a significant investment;
- The longstanding existing nature of the Steel Mill and its place in the community. This includes positive effects associated with provision of employment, including 1,276 direct full time equivalent employees (FTEs) of the NZ Steel businesses, and a further 2,787 FTEs through indirect and induced employment;
- The contribution made by NZ Steel to Auckland's and New Zealand's gross domestic product (GDP), with a total contribution made to Auckland's GDP of $431 million, and to New Zealand's GDP of $596 million.
- The extensive information concerning the existing environment and the conservative approach taken to the assessment;

[6] However for the Main Air Permit this does not include Lot 1 DP 62129 (identified in **Appendix C**) as this parcel was purchased after the Main Air Permit was granted.
[7] 35 years from date of commencement, which is set at 18 May 2009, following Environment Court order under section 116 of the RMA.

- The fact that there is a high degree of understanding regarding the actual and potential adverse effects of the Proposal given the extensive nature of the assessments undertaken as part of this consenting process, together with the long-term record of monitoring and assessments; and
- The fact that effects of the activity can be appropriately managed with the management, monitoring and mitigation measures outlined in Section 4 and through conditions of consent (as discussed at Section 11), particularly those conditions that provide for 'living' management plans and review conditions.

These combined factors support the view that the proposed 35 year term is reasonable and accords with Part 2 of the RMA.

2 Environment against which effects are assessed

2.1 Site location – surrounding area

The Site is approximately 550 hectares, located in the Glenbrook area, south of Auckland, as shown in **Figure 2.1**.

The surrounding area is predominantly rural with modifications by human activity and modern farming practices, such as fenced paddocks and cropping. The Site is surrounded by small and large rural landholdings, typically including one or more dwellings. Lifestyle blocks and horticultural activities (including kiwifruit orchards) are also located within the surrounding area. Glenbrook Primary School lies approximately 1.3 km to the east of the Site.

An electrical substation owned by Transpower Ltd is located directly adjacent to the Steel Mill. The topography of the surrounding area can broadly be described as flat, low-lying coastal terrain.

To the west of the Site is the Waiuku River, which, despite its name, is a long and relatively narrow tidal arm (estuary) of the Manukau Harbour. For the avoidance of confusion, the term “Waiuku Estuary” is therefore used throughout the AEE. The Waiuku Estuary is associated with low coastal cliffs and rural land sloping down to a mangrove-lined estuary. To the west of the Waiuku Estuary lies the Āwhitu peninsula comprising ancient sand dunes, which form a barrier between the Manukau Harbour and the Tasman Sea.

To the east of the Site are the Franklin lowlands, which stretch all the way to Papakura. The lowlands are generally rolling, to relatively flat. The southern shore of the Manukau Harbour is characterised by creeks, rivers and tidal arms (of which the Waiuku Estuary is one) which extend inland and create distinct geographical areas within the Franklin lowlands.

Pukekohe is the largest urban centre near the Steel Mill and lies approximately 14 km (as the crow flies) directly east of the Site. However, the nearest township to the Steel Mill is Waiuku, which is approximately five kilometres south-west of the Site. Until the construction of the Steel Mill, Waiuku was a small service centre for the surrounding rural area. Since construction, the township has grown considerably through a combination of direct and indirect employment related to the Steel Mill and people seeking a rural lifestyle. Glenbrook-Waiuku Road is the main access road to Waiuku from the Auckland Southern Motorway. The settlement of Glenbrook Beach, which has also experienced considerable growth in recent years, is located approximately three kilometres to the north of the Site and is accessed via Glenbrook Beach Road which passes the Steel Mill.

Figure 2.1: NZ Steel Site location

2.2 Description of Site and Operational Area

Approximately 190 hectares of the Site is used for the operational aspects of the Steel Mill (defined above as the 'Operational Area') and is denoted by the white dashed line in **Figure 2.1** and **Figure 2.2**. **Figure 2.2** also characterises the activities undertaken within the Operational Area[8].

The northern portion of the Operational Area is where the majority of the raw materials in the iron and steel making process are stockpiled, including coal and Primary Concentrate[9] (PC). The central part of the Operational Area comprises the Iron and Steel Plants. To the east and south of the Iron and Steel Plants are the Finishing Plants, Rolling Mills, storage yards, workshops and administration offices.

The Operational Area comprises a number of buildings, structures and stockpiles of varying sizes, the highest of which are the stacks at approximately 60 metres. The processes that occur within these areas are described in further detail in Section 3 below.

The Site is heavily modified by the Steel Mill's activity, including its associated plant, infrastructure and ancillary structures and activities. The Steel Mill contrasts to the generally rural surrounds and creates a distinctive and prominent landmark. It is noted that the Steel Mill is located within the Auckland Rural Airshed.

There are two road access points to the Site, via Mission Bush Road and Glenbrook Beach Road/Glenbrook Road. The Steel Mill is also served by the Mission Bush Branch railway line, which was formerly a branch line to Waiuku.

[8] Where areas within the Operational Area are not identified as having a specific activity, they contain NZ Steel ancillary activities that do not contribute to air discharges.

[9] Concentrated ironsand slurry pumped to Glenbrook. This is because ironsand mined at WNH goes through a concentrating plant to increase the iron percentage.

Figure 2.2: NZ Steel Site, Operational Area and key activities

The Operational Area, plus some additional land to the north and south (which is currently used for rural purposes) is zoned Business – Heavy Industry in the AUP. The AUP's Business – Heavy Industry Zone provides for large-scale industrial activities, such as the Steel Mill, that may produce objectionable odour, dust and noise emissions[10]. Heavy traffic movements are anticipated as the

[10] H16.1 Zone Description

zone is noted to typically be located close to key freight routes. Storage or production of hazardous materials are also anticipated through higher quantity thresholds identified for the zone[11]. Consequently, a lower level of air quality amenity is anticipated by the AUP in these zones.

The AUP contains specific recognition of the Steel Mill through the 'Glenbrook Steel Mill Precinct':

> *"The purpose of the Glenbrook Steel Mill Precinct is to support and enable the continued operation of the existing steel mill and associated facilities. The Glenbrook Steel Mill is located on Mission Bush Road, Glenbrook and is a significant industrial resource within the Auckland region. This precinct seeks to provide for the mill's growth and operation in a way that continues to support the local, regional and national economy. [12] "*

Outside the industrial zoned Operational Area, NZ Steel owns land to the north, east and south which is zoned, and generally used, for rural purposes as shown on **Figure 2.3**. This forms a greenbelt around the Steel Mill and acts as a buffer between the Steel Mill and the surrounding farmland and communities.

Pockets of vegetation are located on the Site, two of which in the south-eastern corner are identified as Significant Ecological Area -Terrestrial (SEA-T) area within the AUP. These are discussed further at Section 2.5.6 below. Boundary vegetation is also used for screening of the Steel Mill from the local surrounds.

[11] Table E31.4.3 of the AUP. Note the Steel Mill is not designated as a Major Hazardous Facility by Worksafe.
[12] Precinct description - Section I415.1 of the AUP

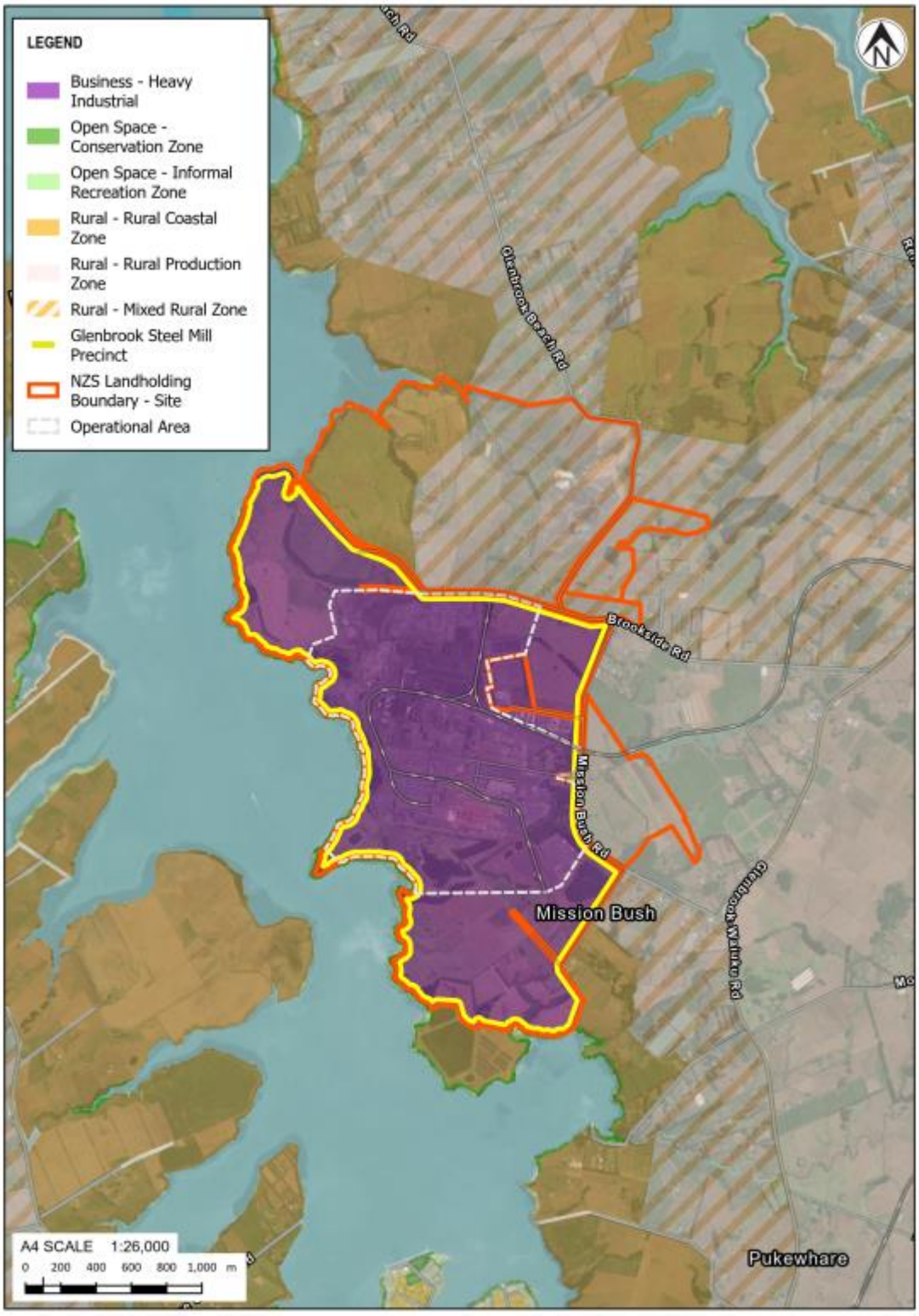


Figure 2.3: NZ Steel Site and AUP zoning

2.3 Statutory context for "environment"

Section 104 and Schedule 4 of the RMA require that an application for a resource consent consider the activity's effects on the "environment".

The "environment" for the purposes of this application includes both the environment as it currently exists and the future environment, which while not being artificial, may be amended to include non-fanciful activities and associated effects.

The environment, for the purpose of this application, relates to the air environment and its current quality is based on monitoring data collected during the preparation of this application and reflects the background levels of contaminants in the environment, together with the effects of the operation of the Steel Mill. In terms of the future environment, there are no known unimplemented resource consents in the wider area and no permitted land use changes or discharges that are likely to have a bearing on this application[13].

For applications to replace expiring resource consents such as this one, consideration must be given to the environment that would exist without the activities and associated effects authorised by the expiring consents (i.e., disregarding ongoing effects that arise as a result of the Steel Mill's air discharge operations). However, the legacy effects of past authorised discharges remain relevant to the environment against which effects are assessed.

Section 2.4.2 provides a summary of the background ambient air quality environment consistent with the above. Section 7 then assesses the effects of the Proposal on that air environment. However, as all background contaminant levels are either very small (such as TSP and PM_{10}) or there is no ambient monitoring data available, the assessment of effects in Section 7 has used the full ambient monitoring data available. This includes background levels of contaminants and presents a conservative assessment of effects of the Proposal in accordance with the NESAQ.

2.4 Existing ambient air quality

2.4.1 Meteorology

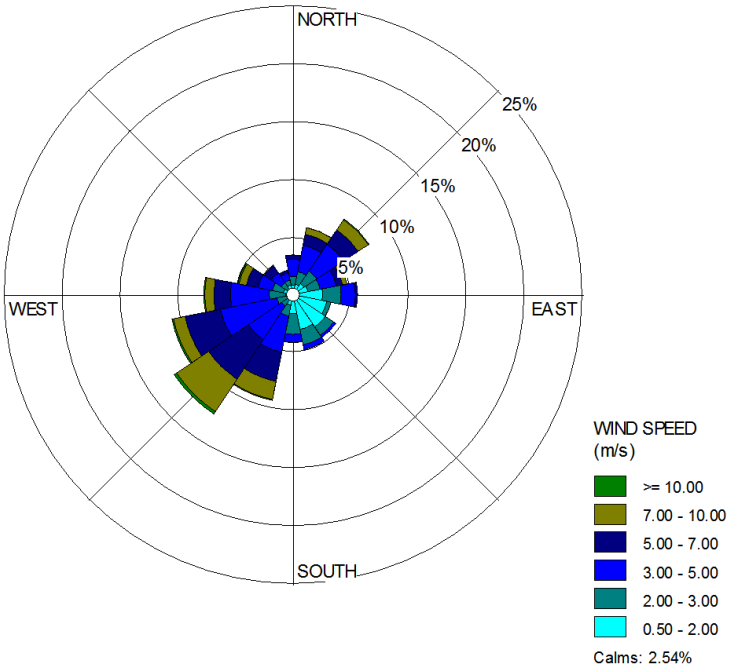
Meteorological conditions, particularly wind direction and speed, influence the dispersion of contaminants. Wind roses are a useful graphical representation of wind speed and direction data. The arms of the wind rose show the direction the wind is blowing from and its speed.

Site specific meteorological data is collected on-site at the Steel Mill ambient monitoring station at the Training Centre (Site 3), identified in **Figure 4.2**. Based on the meteorological data captured from the Training Centre (Site 3) since June 2019[14] the average local wind speed is generally around 4 m/s and the highest frequency of strong winds (wind speeds greater than 5 m/s) are recorded from the south-western direction. This is consistent with the typical wind direction experienced on the west coast of the Auckland region. Secondary winds are typically observed from the north east.

NZ Steel's 64 Glenbrook Beach Road monitoring site (Site 20) is directly downwind of the Steel Mill during south-westerly winds and is therefore considered broadly representative of downwind receptors.

[13] While some minimal industrial development could occur on the Heavy Industry Zone land to the south of the Steel Mill as of right, most industrial air discharges would trigger resource consent requirements and therefore assumptions have not included development of the Heavy Industry Zone land.

[14] A new meteorological monitoring station with a 10 m mast was installed at the Training Centre (Site 3) in June 2019. Prior to this, a meteorological monitoring station did exist at the site however, the reliability of the data this produced is uncertain and therefore it has not been used for the purposes of the assessment.



NZS Training Centre (Site 3) wind rose (2020)

Calms (wind speed of <0.5 m/s): 2.54%

Average wind speed: 3.74 m/s (wind mast at 10 m)

Figure 2.4: Wind rose for data from on-site meteorological station

2.4.2 Ambient air quality

NZ Steel has carried out extensive ambient air monitoring (discussed in detail at Section 4.5.2) for a range of different contaminants in the vicinity of the Site to better understand the effects of the Steel Mill on the surrounding air environment. Figure A5 at **Appendix E** shows the location of each of the monitoring sites, their distance from the Operational Area and which contaminants each site monitors.

Ambient air monitoring is necessary to provide an assessment of the contribution of the Steel Mill's air discharges to ambient air quality. This is because ambient air quality monitoring data represents the cumulative concentrations of air contaminants as a result of emissions.

Therefore, in order to assess the effects of the discharges from the Steel Mill, the monitoring data from the 64 Glenbrook Beach Road monitoring site (Site 20) (which is directly downwind of the Steel Mill) has been assessed in more detail by evaluating concentrations measured when the wind was not downwind of the Steel Mill. This provides an understanding of the background air quality environment excluding the contribution from the Steel Mill.

The approach used is likely to under-estimate the contribution of marine aerosols to background air quality. This is because south-westerlies, which have been excluded from the dataset, are the predominant winds and therefore the prevalence of off-shore winds will be over-represented in the air quality monitoring data.

Calculation of the background levels of each monitored contaminant, using the wind-direction-exclusion method, has been undertaken. **Table 2.1** shows the 1-hour average background

contaminant concentrations. The 75th percentile value of the 1-hour average concentrations have been adopted as representative 1-hour and 24-hour average concentrations and the overall average has been adopted as the representative annual average concentration.

For those contaminants where there is no ambient monitoring data, the dispersion modelling approach has been used. For the majority of these contaminants the Steel Mill is considered to be the only appreciable source in the area and therefore the background level is assumed to be zero. The only modelled contaminant considered to have a background level is Carbon Monoxide (CO). Background concentrations of CO have been adopted from the default background concentrations recommended for rural areas in the Good Practice Guide for Assessing Discharges to Air from Industry[15] (GPG Industry). These concentrations are 5 mg/m³ (1-hour average) and 2 mg/m³ (8-hour average).

Table 2.1: Estimated 1-hour background concentrations

Site	**64 Glenbrook Beach Road (Site 20)**					**Training Centre (Site 3)**
Contaminant	**SO_2**	**NO_2**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**TSP**
Directional adjustment based on wind angle	Excluded SW data (180°-270°) from consideration of background concentrations					
Count (hours)	15848	9963		65346	13370	61071
Average concentration (µg/m³)	1.1	4.0	5.6	11.3	5.0	15.9
75th percentile concentration (µg/m³)	1.3	5.1	6.8	15.2	7.7	18.2
Start date	4/04/2017	20/11/2018		20/02/2008	16/03/2018	1/11/2008
End date	30/06/2020	31/12/2020		31/01/2021	31/01/2021	31/01/2021

Given the Steel Mill's rural location, there are no other appreciable point sources of air contaminants (such as industrial or commercial activities) in the area. Therefore, the dominant sources contributing to background concentrations of air contaminants in the area are expected to be non-anthropogenic sources, such as marine aerosols and crustal matter, which can contribute relatively high background levels of particulate matter.

Anthropogenic sources of combustion-related air contaminants will include small-scale combustion equipment, domestic heating emissions (including emissions transported from Waiuku Township), motor vehicle emissions and occasional rural open burning. Intermittent rural activities such as fertiliser spreading, ploughing, harvesting and haymaking could contribute to measured particulate matter concentrations intermittently.

Consequently, the background concentrations of contaminants (other than Total Suspended Particulate (TSP) and particulate less than 10 µm in size (PM_{10})) are very small as would be expected in a rural environment, therefore, the full monitoring data set has been used for the assessment of effects. Whereas TSP and PM_{10} are likely to have other sources in the area and therefore it is useful to understand the likely ambient air concentrations in the absence of the Steel Mill's contribution, to enable an assessment of the effects of TSP and PM_{10} discharges on the environment.

[15] Good Practice Guide for Assessing Discharges to Air from Industry. (2016). Ministry for the Environment. Publication number: ME 1276

2.4.3 Auckland's regional air quality

The Auckland air emissions inventory 2016, published in December 2019[16], identified and quantified sources of air pollution and their trends for the region and is considered broadly representative of the current profile for the Auckland region. This is important for understanding the regional context for the Site's contaminant emissions. **Figure 2.5** below provides a summary of the Auckland region emissions profile in 2016. This shows that the main sources of contaminants that degrade Auckland's air quality are transport and domestic sources.

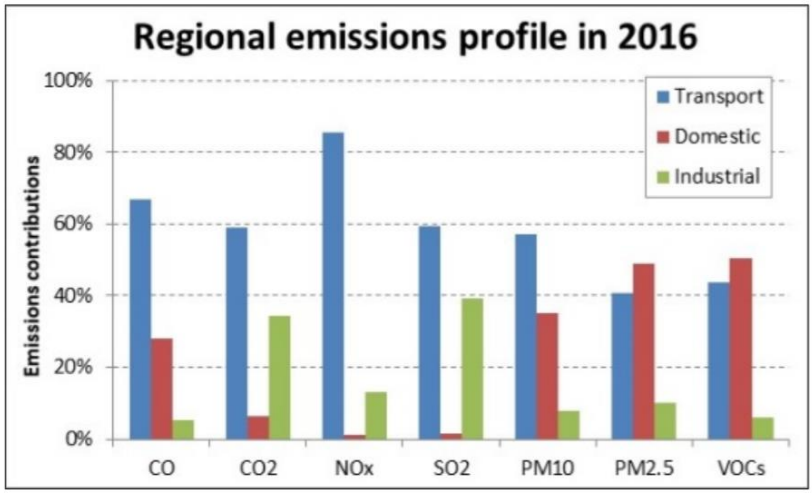


Figure 2.5: Auckland regional emissions profile 2016

The inventory concluded that, across the region, transport is the biggest source for most pollutants (i.e. CO, CO_2, NO_x, SO_2 and PM_{10}). Domestic sources (such as home heating, cooking, lawn mowing and outdoor burning) are the biggest contributors to $PM_{2.5}$ and VOCs emissions. This is because nearly half of $PM_{2.5}$ (45.0%) and VOCs (48.3%) come from wood burning used for home heating[17] .

From 2001 to 2016, emissions of air pollutants from transport, domestic and industrial sectors decreased due to a downward trend in emissions from motor vehicles and domestic wood burning for home heating. PM_{10} and $PM_{2.5}$ emissions have decreased by 18.7 % and 22.4 % between 2006 and 2016. The monitored PM_{10} and $PM_{2.5}$ ambient concentrations have shown a downward trend since regular measurements began in the late 1990s and have met air quality standards and guidelines since 2014 and 2015, respectively. CO_2 emissions have fallen since 2006 mainly due to reduced industrial activities (therefore emissions), however, this has been partly offset by increased vehicle emissions[18].

Therefore, the contribution of industry (which includes the Steel Mill) is much less than that of transport and for some contaminants, particularly particulate and VOCs, much less than domestic sources, as shown by **Figure 2.5**.

It is noted that the Steel Mill is located within the Auckland Rural Airshed. The Airshed is not considered to be polluted under Regulation 17 of the NESAQ.

[16] Auckland air emissions inventory 2016 (Auckland Council technical Report 2019/024) December 2019.
[17] Page 6, Section 3.1 Emissions and Sources, Auckland air emissions inventory 2016.
[18] Page 35, Section 8 Conclusions, Auckland air emissions inventory 2016.

2.5 Sensitivity of the Receiving Environment

2.5.1 Overview

When assessing air discharges, it is appropriate to consider the sensitivity of the receiving environment. This includes recognising the sensitivity of the surrounding zones (discussed in Sections 2.5.2 and 2.5.3), identified sensitive receptors (discussed in Section 2.5.4) and any ecosystems that may be sensitive to air discharges (discussed in Section 2.5.5).

2.5.2 Industrial zones

People in industrial areas are typically present in the area for less than 24 hours per day and are principally present for employment and do not use the area for more sensitive purposes such as recreation, worship, education or residential. People who are present in, or are located near, industrial environments are more likely to tolerate adverse effects on amenity values, as long as the effects are not severe[19] and particularly if the source is associated with their employment or is typical of other industry in the area.

2.5.3 Surrounding rural zoned land

Beyond the industrial zoned land, NZ Steel owns land to the north, east and south which is zoned, and used for rural purposes with the exception of the one closed landfill and one operational landfill operated by NZ Steel (which are subject to separate consents as discussed at Section 1.5 and therefore do not form part of the scope of this consent application). This forms a greenbelt around the Steel Mill and acts as a buffer between the Steel Mill and potential sensitive receptors – discussed further in Section 2.5.4.

The land beyond the buffer is also predominantly zoned for rural purposes. As such, farming is the main economic activity that occurs within the receiving environment and the land is subject to the AUP's rural zones. The AUP provides for this farmland using three different rural zones. The purposes of each of these zones, as described in the AUP, are:

- The Rural Production Zone is to provide for the use and development of land for rural production activities and rural industries and services, while maintaining rural character and amenity values[20].
- The Mixed Rural Zone is to provide for rural production, generally on smaller rural sites and non-residential activities of a scale compatible with smaller site sizes[21].
- The Rural Coastal Zone is to retain and enhance the rural character and amenity values, local coastal character and biodiversity values of rural areas along Auckland's harbours, estuaries and coastline. It is also to enable rural production activities, local non-residential activities, maintain recreational opportunities and manage the effects of existing scattered rural lifestyle development. The zone also provides opportunities to access the coastal marine area and support marine-related activities[22].

These zones provide for largely rural activities such as farmed animals, horticultural, forestry and mineral extraction. The AUP also anticipates that these rural activities generate effects associated with noise, odour, dust, traffic and visual effects and will generally not give rise to issues of reverse sensitivity in these zones[23]. Rural zones in the AUP also seek to maintain a largely rural character by

[19] Ministry for the Environment 'Good Practice Guide for Assessing and Managing Odour', 2016
[20] AUP, H19.3.1.
[21] AUP, H19.4.1.
[22] AUP, H19.5.1.
[23] AUP, H19.2.4(2).

restricting residential and other non-rural land uses including the fragmentation of productive land[24]. Rural zones are also typically scarcely populated (relative to urban centres).

2.5.4 Sensitive receptors

Within the rural environment beyond the Site, there are activities that have a relatively higher sensitivity to air quality impacts compared to rural land uses (these are known as 'sensitive receptors'[25]). The nearest identified sensitive receptors are[26]:

- Dispersed rural residential dwellings: the closest residential dwelling is located approximately 340 m east/south-east of the Operational Area however, it is noted that this dwelling is approximately 1,585 m from the nearest kiln stack (major point source emission); the closest dwellings in Waipipi (on the western side of the Waiuku Estuary) are over 1.4 km away.
- Glenbrook School: located approximately 1.3 km to the east of the Operational Area.
- The Wymer Road Rest Home: located approximately 3.6 km east of the Operational Area.
- The township of Waiuku located approximately 2.3 km to the south of the Site and the smaller settlement of Glenbrook Beach located approximately 3.4 km north of the Site.

Figure 2.6 identifies the nearest sensitive receptors surrounding the Site.

The assessment undertaken at Section 7 is largely based on the monitoring data of the 64 Glenbrook Beach Road (Site 20) monitoring site which is located within the Site, directly downwind of the Steel Mill and is considered a conservative representation of the affected off-site sensitive receptors and any potential additional future receptors.

[24] AUP, H.19.2.1 and H19.2.3.

[25] As discussed at Section 3.7 of the GPG Industry. Sensitive receptors are locations where people may be present at all times of the day, both indoors and outdoors and may include people of high sensitivity (such as children or elderly). Sensitive land uses include, but are not limited to, hospitals, schools, childcare facilities, rest homes, marae, residential dwellings and recreation spaces.

[26] Note that these are measured from the Operational Area boundary (shown in white dash in **Figure 2.6**)

Figure 2.6: NZ Steel Site and Operational Area relative to nearest sensitive receptors.

2.5.5 Sensitive ecosystems

The Site is located in a largely modified rural environment. The AUP contains a Significant Ecological Area -Terrestrial (SEA-T) overlay which identifies areas of significant ecological value such as significant indigenous vegetation or significant habitats of indigenous fauna in the region. There are two SEA areas within the Site located south east of the Operational Area (identified as SEA_T_5330 and SEA_T_5329 in the AUP). SEA_T_5330 is a taraire, tawa, podocarp forest and SEA_T_5329 is a pōhutukawa, puriri, broadleaved forest[27] . The SEA-T areas are shown on **Figure 2.7** below.

Figure 2.7: NZ Steel Site and Operational Area relative to sensitive ecosystems (represented by SEA-T overlay in AUP).

[27] Auckland Council Geomaps (2021). Biodiversity – Ecosystems current extent

2.5.6 Summary

In summary, the Proposal's immediate receiving environment is largely insensitive to lower ambient air quality, particularly dust impacts, being largely industrial or rural zoned land owned by NZ Steel. Beyond the Site the environment is comprised of rural land with a low density of dwellings and other sensitive land uses. Small pockets of sensitive ecosystems exist in the south-east of the Site.

2.6 Cultural environment

The Tahuna Marae, of Ngāti Te Ata is situated opposite the Site on the western side of the Waiuku Estuary, approximately 2 km (as the crow flies) from the Site. The Manukau Harbour, including the Waiuku Estuary, is a Coastal Statutory Acknowledgement Area of Ngāti Tamaoho and is of interest to many other iwi in Auckland (Figure 2.8 below shows Statutory Acknowledgement Area related to the Manukau Harbour).

NZ Steel have a long-standing relationship with both the Ngāti Te Ata and Ngāti Tamaoho iwi. Representatives of both iwi sit on the Steel Mill's Environment Committee (discussed further at Section 10) and through this forum are kept up to date with the Steel Mill's environmental performance and have the opportunity to be involved in discussions. In the course of the preparation of this application, NZ Steel has met with both iwi to discuss the consent applications (see Section 10) and develop further its understanding of the cultural values which are relevant to NZ Steel's activities.

A number of iwi groups have made applications for customary marine title or protected customary rights in the area relevant to the Steel Mill (the Manukau Harbour, and in particular the Waiuku Estuary). In accordance with the Marine and Coastal Area (Takutai Moana) Act 2011, NZ Steel has notified and sought the views of these groups as discussed in Section 9.5.2.2.

Auckland Council Geomaps also shows a number of Cultural Heritage Inventory (CHI) places located along the coastal margins of the Site, as shown in **Figure 2.8** below. While these have been identified for the purposes of the description of the environment, we note that they are not affected by this application for discharges to air, and therefore are not discussed further.

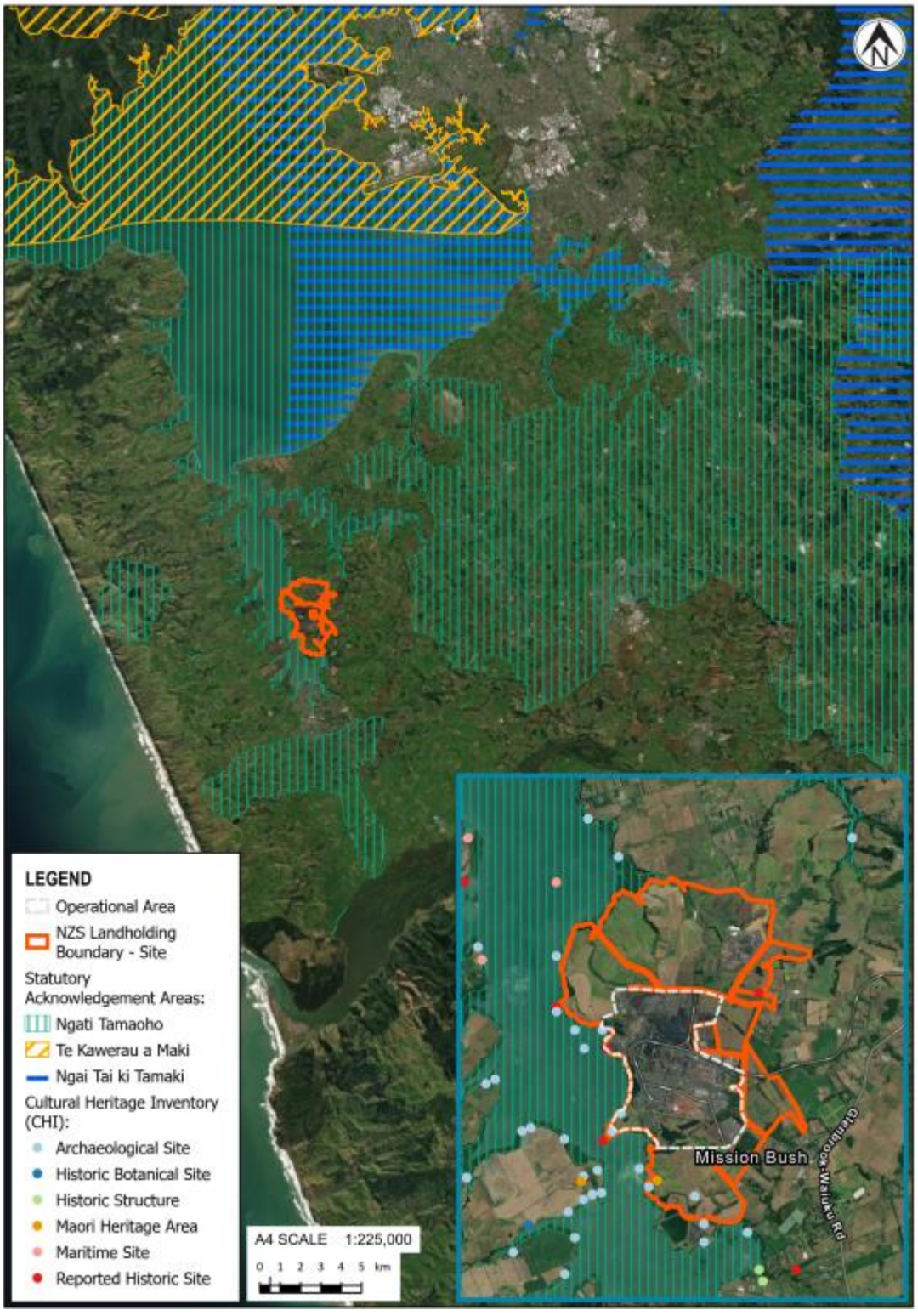


Figure 2.8: NZ Steel Site relative to sites of cultural interest including Statutory Acknowledgement Areas and Cultural Heritage Inventory locations

3 Steel Mill operations

3.1 Overview

NZ Steel manufactures iron and steel in the Iron and Steel Plants (referred to collectively as the Primary Plants) and the steel slab is further processed in the Rolling Mills and Finishing Plants, to produce a range of steel metal coated and pre-painted products. Other products produced in the Primary Plants such as steel billets and plate iron are then sent for further processing at other facilities within the Bluescope business (within New Zealand and internationally).

The key processes and associated discharges from the iron and steel making facilities are described at Section 3.2. Section 3.3 provides an overview of activities outside of the key plants that contribute to fugitive discharges from the Site.

The descriptions provided in both Sections 3 and 4 of this report are, by necessity, a relatively high-level overview of the complex activities that occur. Ongoing improvements to complex processes for efficiency, quality of product, and environmental performance are regularly made by NZ Steel within the scope of the existing air permits (Main Air Permit and Commercial Iron Plating Air Permit) and this is proposed to continue under the replacement air discharge permit.

The key discharges of contaminants to air from the Steel Mill, through both point source and fugitive emissions, can be categorised as follows:

- Particulate from fugitive and point sources (TSP, PM_{10} and $PM_{2.5}$);
- Combustion products including sulphur oxides (SO_x), nitrogen oxides (NOx), carbon monoxide (CO), dioxins and polyaromatic hydrocarbons (PAHs);
- Hydrogen chlorides (HCl) and chlorine (Cl_2) from the acid regeneration process; and
- Volatile Organic Compounds (VOC)s from the application of paints.

Figure 2.2 provides a spatial overview of the location of key components of the Steel Mill and the Air Quality Assessment (AQA) provided at Appendix F contains a more detailed description of the Steel Mill operations.

3.2 Iron and steel making discharges

There are many processes involved in iron and steel manufacture undertaken at the Steel Mill. This section provides an overview of the processes undertaken at the Steel Mill. The emissions controls of each plant are discussed further at Section 4.3. A more comprehensive process description is contained within the AQA (**Appendix F**).

Table 3.1 to **Table 3.5** provide an overview of the contaminants resulting from each of the key processes or operations undertaken at the Steel Mill.

3.2.1 Iron plant

The Iron Plant involves the following processes/operations:

- Four multi-hearth furnaces (MHFs) heat the raw materials Primary Concentrate, coal, limestone and KOBM slag;
- Four Rotary Kilns (the Kilns) then convert the preheated Primary Concentrate and Char mixture from the MHFs to metallic iron by chemical reduction to produce Reduced Primary Concentrate and Char (RPCC);
- The RPCC is then discharged from the Kilns to closed transfer vessels for delivery to the Melters, or a 700-tonne storage hopper;

- The two Melters use electrical current to melt the solid RPCC to produce molten iron and slag. Slag is tapped into a slag pot and iron is tapped into an iron ladle;
- The molten iron is transferred from the Melters to the Steel Plant in refractory lined charging ladles;
- Melter Slag is transferred to the slag handling area, where it is poured into pits and allowed to cool before further processing; and
- In addition to the manufacture of iron, the Iron Plant includes two Cogeneration Plants to capture waste gas energy from the MHF, Kilns and Melters.

Table 3.1: Iron plant air discharge overview

Process and plants	Product used, transformed or created in the process	Potential contaminants
Iron Plant Multi Heat Furnaces (MHF) (4) Rotary kilns (4) Melters (2)	Coal Limestone Primary c=Concentrate (Ironsand) KOBM Slag Recovered RPCC and other iron co-products Melter Slag Molten iron	Particulates Carbon monoxide (CO) Oxides of sulphur (SO_2 and SO_3) Carbon dioxide (CO_2) Hydrogen Sulphide (H_2S) Nitrogen oxides (NOx) Polycyclic aromatic hydrocarbons (PAHs) Hydrogen (H_2) Trace metals (Al, B, Co, Cu, Cr, Pb, Mg, Mn, Sr, Zn) Potassium (K) Iron (Fe) Polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran (PCDD/F) Water vapour

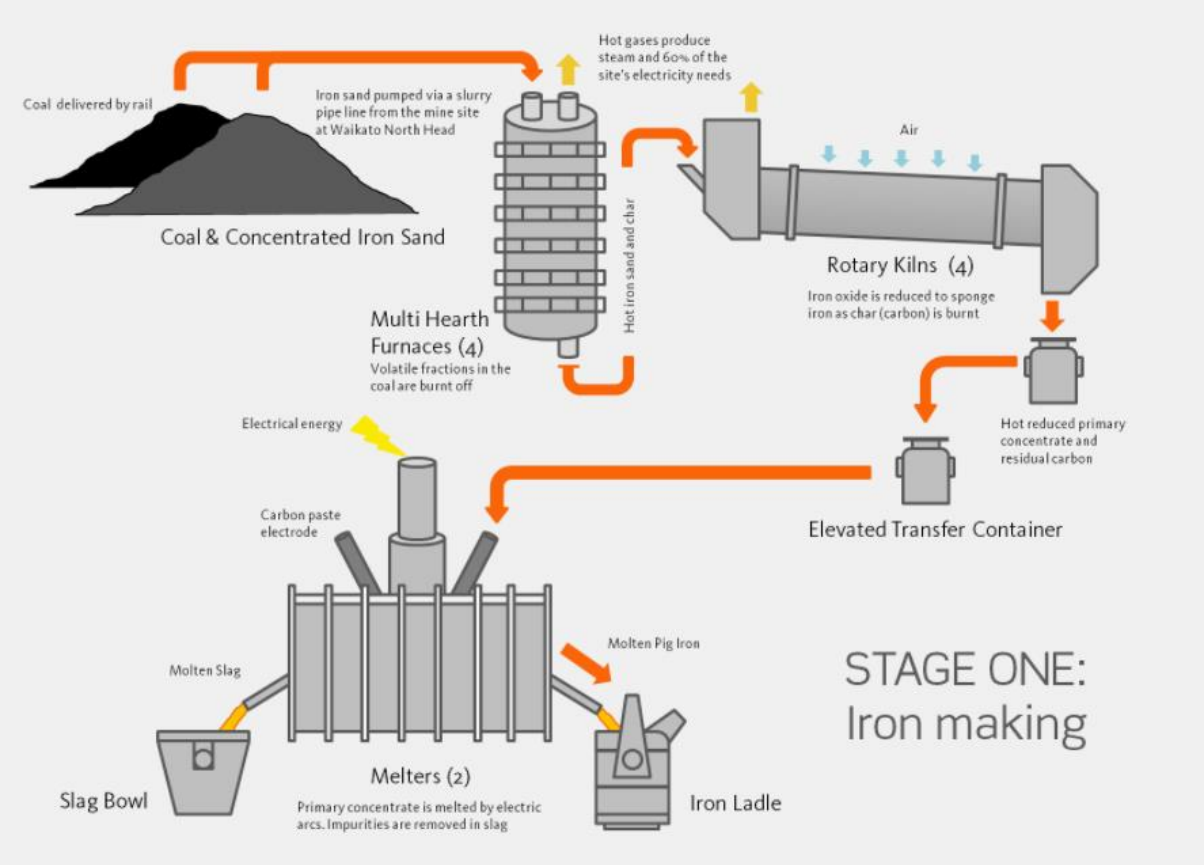


Figure 3.1: Iron plant indicative process summary diagram

3.2.2 Steel plant

The Steel Plant involves the following processes/operations:

- Ladles containing iron from the Melters enter a Vanadium Recovery Unit (VRU) where controlled oxygen blowing releases a vanadium-rich slag which is racked off;
- Molten iron is then mixed with scrap steel in the Oxygen Steel Making Furnace (referred to as the KOBM, named from the process 'Klockner Oxygen Blown Maxhutte'). The KOBM removes impurities and reduces the carbon content of the iron, converting it to liquid steel. The steel is then tapped to a ladle;
- If the steel in the ladle is to be made into slabs it is transferred to the Ladle Treatment Stations where ferro-alloy additions are made to bring the composition up to the required specification for slab casting. If heating is required, it will be achieved through the exothermic reaction of aluminium and oxygen. Following treatment, the ladle is taken to the Continuous Casting Machine that casts the slabs in a single continuous strand to dimensions of 210 mm thick and 800 to 1550 mm wide. The slab is then cooled, cut into lengths and transferred to the cooling table and storage yard; and
- If the steel in the ladle is to be cast into billets (rather than slabs) the ladle is transferred to the Ladle Metallurgical Furnace. The Billet Caster casts 120 to 150 mm square billets that are cooled via a closed-loop water cooling system.

Table 3.2: Steel Plant air discharge overview

Process and plants	Product used, transformed and created in the process	Potential contaminants
Steel Plant Oxygen Steel Making Furnace (KOBM) Vanadium Recovery Unit (VRU) Ladle metallurgical furnace (LMF) Ladle treatment system (LTS) Continuous slab caster Billet caster	Molten iron from the Iron Plant Metal scrap Millscale KOBM slag Vanadium slag Additives (e.g. Lime, ferrous silica)	Particulates Carbon monoxide (CO) Carbon dioxide (CO_2) Oxides of sulphur (SO_2 and SO_3) Iron (including Iron Oxide) Trace metals Nitrogen oxides (NO_x) Polycyclic aromatic hydrocarbons (PAHs) Metal oxides Polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran (PCDD/F)

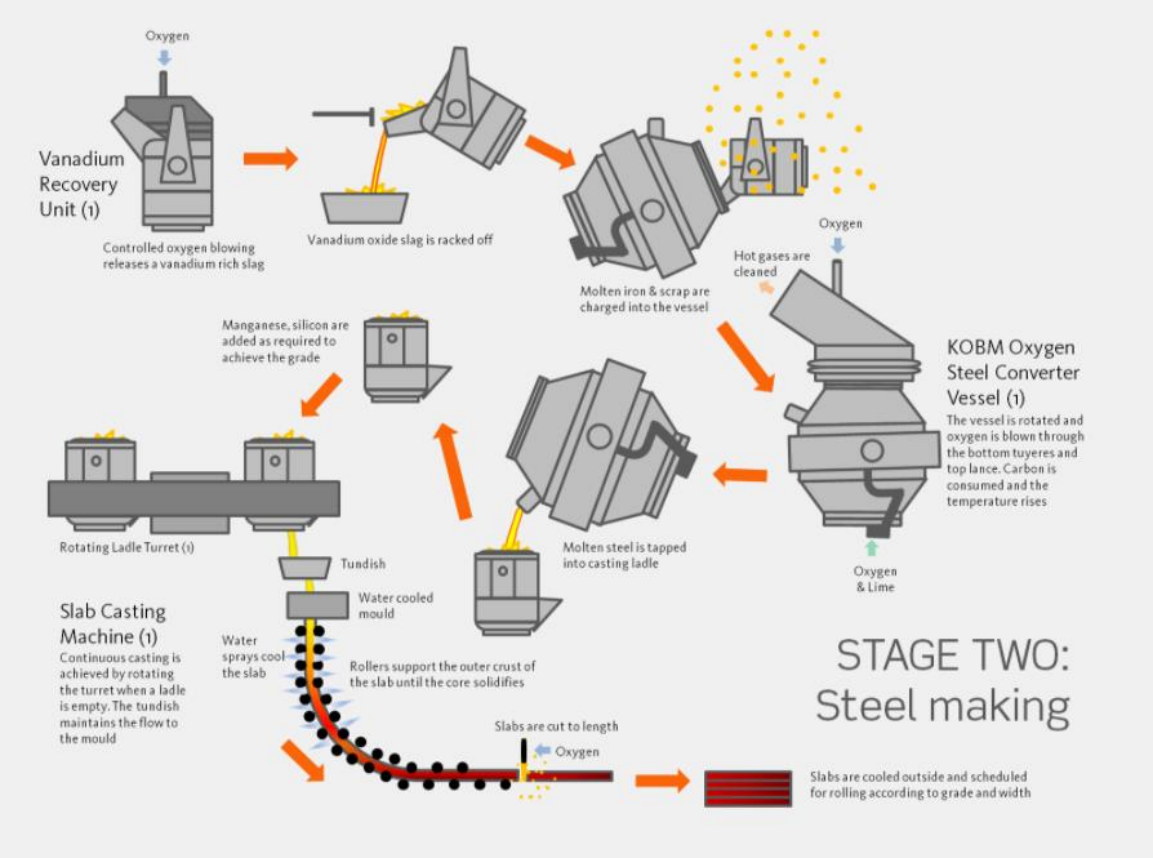


Figure 3.2: Steel plant indicative process summary diagram

3.2.3 Rolling mills

The Rolling Mills consist of a hot and cold rolling mill, which roll steel slab into various flat products for direct sale or further processing in the Finishing Plants.

The **Hot Strip Mill** processes steel slabs into hot rolled coils and plate for further processing. This comprises the:

- Slab Reheating Furnace where the slabs are reheated in the furnace and then passed through a high-pressure water spray to remove Millscale and the steel slab is then conveyed to the roughing mill;
- Roughing Mill where the slabs are reduced from their initial thickness of 210 mm to a bar between 18 mm and 32 mm in five, seven or nine passes backwards and forwards through the mill;
- Finishing Mill which reduce the bar to the required thickness. A water-cooling system cools the strip to the correct temperature. The coils are then transferred by conveyors to the hot coil cooling yard;
- Skin Pass Mill where hot rolled coils are processed to correct shape, improve surface finish and to avoid coil breaks during further processing. The Skin Pass Mill is equipped with an oil spraying booth to protect export coils against rust; and
- Plate Line where heavy plates, up to 50 mm thick, are produced by rolling to thickness in the Roughing Mill and Finishing Mill, by-passing the coil box and down coiler. The plates are gas cut into 13 metre master lengths then air-cooled, levelled, inspected and cut to final length.

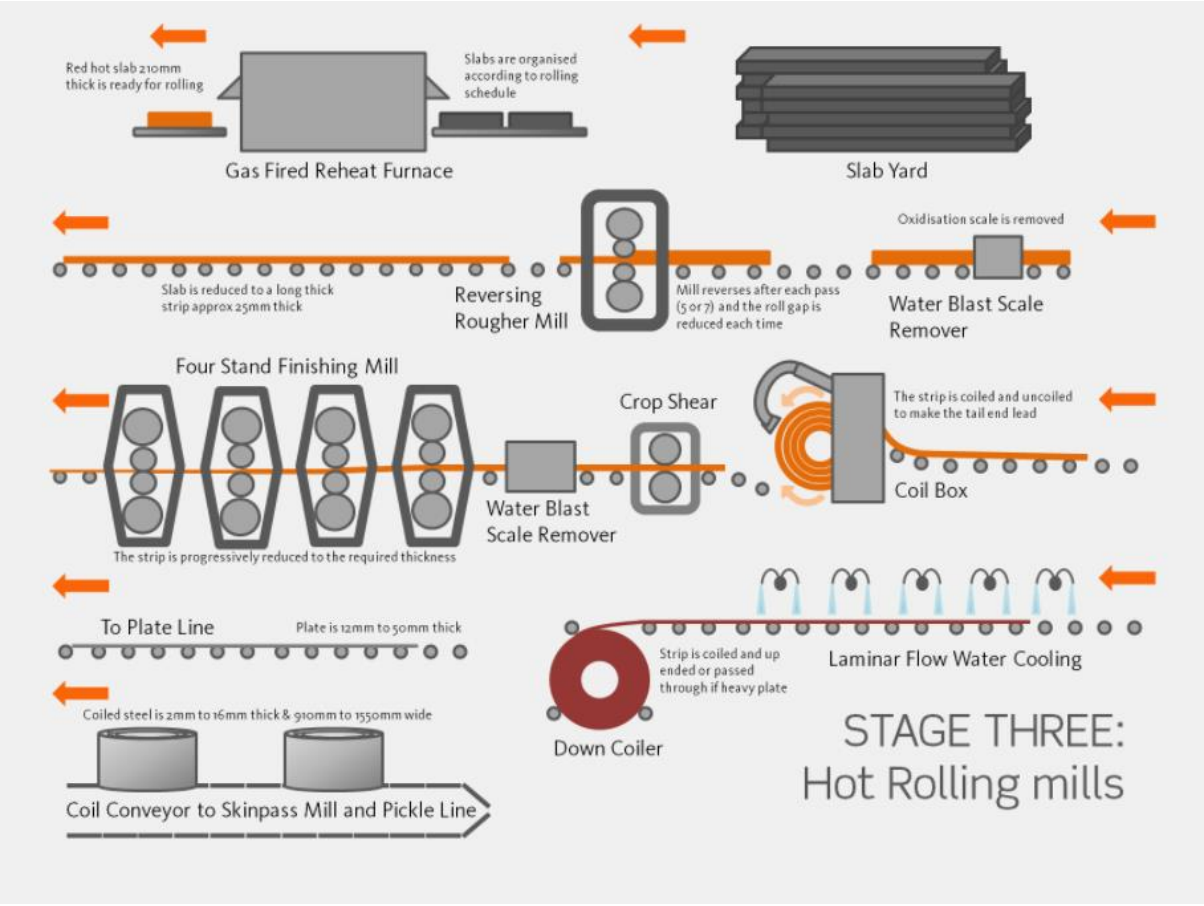


Figure 3.3: Hot strip mill indicative process summary diagram

The **Cold Strip Mill** further reduces the strip thickness and imparts a higher quality finish than is possible in the Hot Strip Mill. This comprises the:

- Pickle Line where a series of pickling tanks containing hydrochloric acid solutions and wash water that removes the fine layer of iron oxide scale that is generated during hot rolling to produce a strip surface suitable for cold rolling;
- Acid Regeneration Plant (ARP), an important ancillary plant associated with the Pickle Line in which spent acid is recovered and regenerated for re-use;
- Reversing Mill, where coils from the Pickle Line are reduced by a pass in one direction, recoiled and then passed through the mill in the reverse direction. Between five and seven passes are made until the correct gauge is obtained. The coil is then banded and labelled in readiness for transfer to the Metal Coating Line;
- Combination Mill, cold rolls pickled coils to the required thickness for annealing and then temper rolls the annealed coil to customer requirements;
- Annealing furnace28 , controlled heating and cooling of the coils is carried out in three natural gas fired furnaces. Annealing restores the ductile properties of the steel strip, which is hard and brittle after cold rolling;
- Recoil Line, where coils are processed by uncoiling and removing off-gauge material, side trimming, slitting to width for customer requirements, inspecting, oiling and recoiling; and
- Shear Line receives cold rolled, annealed and temper rolled coil which it levels, cuts to length, oils, piles and packs for dispatch as flat sheet.

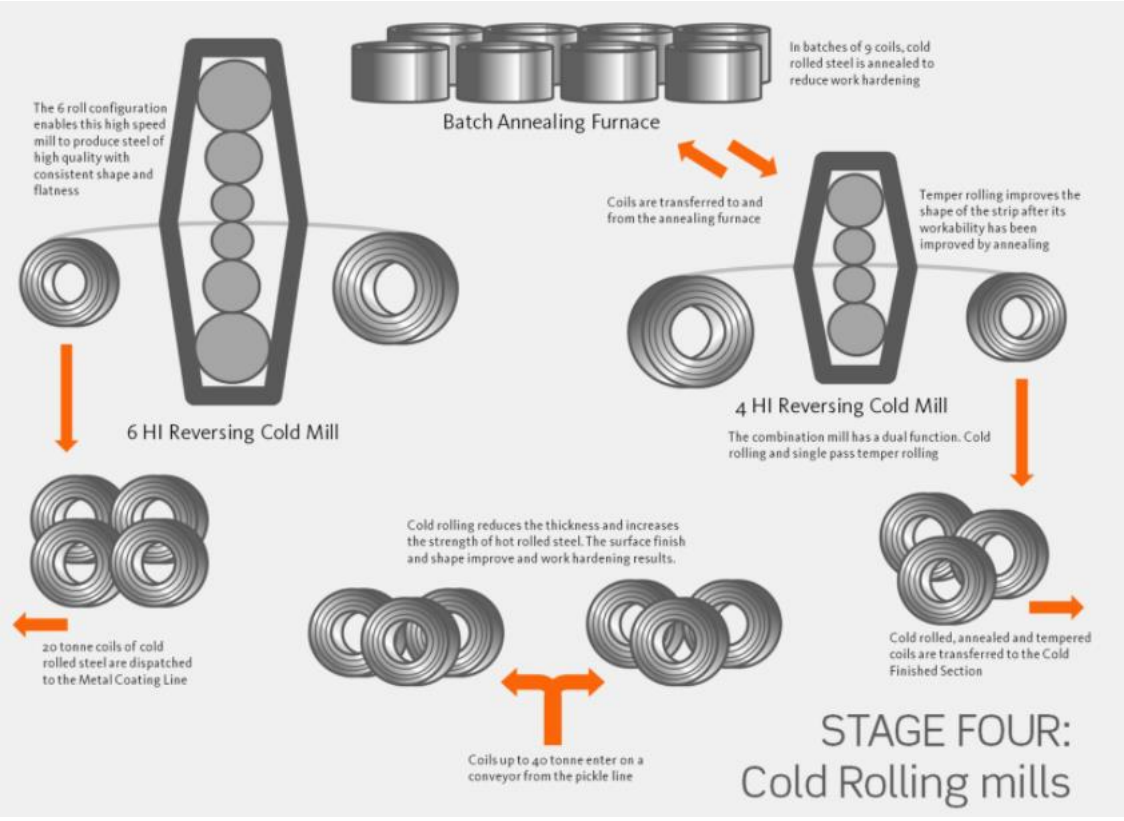


Figure 3.4: Cold strip mill indicative process summary diagram

[28] The three Annealing Furnaces will close (anticipated to occur April 2021). However, it is noted that the emissions from the Annealing Furnaces are included in the ambient monitoring as they were a contributing source for the assessment undertaken.

Table 3.3: Rolling Mill air discharge overview

Process and plants	Product used, transformed and created in the process	Potential contaminants
Rolling Mills Hot rolling mills Cold rolling mills Acid Regeneration Plant	Steel slab Oil Hydrochloric acid (HCl)	Particulates Nitrogen oxides (NOx) Calcium ($CaCO_3$, $Ca(HO)_2$, $CaSO_4$, $CaSi_3$) Iron (Fe_2O_3) Carbon dioxide (CO_2) Hydrogen chloride and chlorine (HCl and Cl_2)

3.2.4 Finishing Plants

The Finishing Plants consists of the Metal Coating Line and Paint Line, where steel coils are metal coated either for direct sale or painted in the Paint Line.

- The **Metal Coating Line**, where steel coil received from the Rolling Mills is cleaned, annealed, coated and surface treated to produce Galvsteel®, Zincalume® coil and flat sheet.
- The **Paint Line** applies paint or laminate to coils of hot-dipped galvanised Zincalume® and cold rolled steel in continuous coil-to-coil operation to produce Colorsteel®.

Table 3.4: Finishing Plant air discharge overview

Process and plants	Product used and transformed in the process	Potential contaminants
Finishing Plants Metal coating line Paint line	Steel sheets Surface treatment products (eg resin, zinc, aluminium, paints)	Particulates Chromium (Cr) Zinc (Zn) Aluminium (Al) Volatile organic compounds (VOCs) Nitrogen oxides (NOx) PCDD/F

3.3 Ancillary activities

A number of activities and processes undertaken on the Site have the potential to give rise to non-point source air emissions (referred to in this AEE as fugitive emissions) which are largely comprised of particulate (dust). By their nature these emissions are intermittent and are difficult to quantify at source. The key activities that contribute to fugitive emissions are described below and management methods are discussed in Section 4.4.2.

3.3.1 Bulk raw materials storage and handling

The northern portion of the Operational Area is used for raw material stockpiling on an ongoing basis. Each of the following material stockpiles have the potential to give rise to fugitive emissions:

- Primary Concentrate, which is pumped as a slurry from the Waikato North Head mine and is dewatered and stockpiled before use. Steelserv dries a small volume of PC prior to its addition to the Melters in the Iron Plant;

  Coal, which is delivered by both by train and trucks to the Site. Locally sourced coal delivered by train is directly transferred to the working stockpile via the coal reception hopper. Coal

delivered by trucks is stockpiled in intermediary stockpiles prior to being transferred by loader to the coal reception hopper, for transfer to the working stockpile;

- Limestone and KOBM Slag, are stockpiled prior to transfer by loader to the coal reception hopper to be deposited onto the working coal stockpile; and
- Material from the Primary Concentrate and coal working stockpile (containing KOBM Slag and limestone) is recovered and transferred by conveyor belts into bins to feed the MHF, at the start of the iron making process.

3.3.2 Co-product production, storage and handling

In order to avoid or minimise landfilling, NZ Steel has introduced recovery of a range of iron-rich materials which are generated in the manufacturing facilities. In addition, where co-products (such as Melter Slag) are generated in the iron and steelmaking process, NZ Steel has developed markets to sell these products. The key activities include:

3.3.2.1 Slag production and processing:

Slag is non-metallic residue produced from the iron and steelmaking processes. The three main slags are:

Ironmaking slag

From the Melters ladles of hot molten slag is tipped into open pits and with the addition of cooling water flashes of steam and some entrained particulate occurs. Once cool, the reclaimed slag is stockpiled for weathering before further size reduction in crushers. The material is then screened to produce a variety of grades of roading and drainage aggregates, largely for the Auckland market.

Steelmaking slag

Slag is also produced in the Steel Plant at the VRU (Vanadium Slag) and KOBM (Steelmaking Slag):

- Vanadium Slag is raked off the iron ladle (following control oxygen blowing) into skips. After transfer to an area outside of the Steel Plant building the slag is tipped out for cooling. Once cooled it is transferred to the processing areas and then bagged for export sale.
- KOBM Slag is transferred from the Steel Plant to be tipped into an open pit, to allow for cooling. It is then screened at the Metal Recovery Plant and a significant volume is placed onto the coal stockpiles to replace purchased limestone. The balance is either sold or landfilled.

3.3.2.2 Millscale

Millscale, which is the term for flaked iron oxide generated on the surface of the steel during the cooling of slabs in the Rolling Mills. Millscale is stockpiled for later addition in the iron and steel making processes.

3.3.2.3 Scrap steel cutting

Scrap steel arising from the various Steel Mill manufacturing processes is graded, cut to size for recycling in the steelmaking process (in the KOBM) as discussed in the AQA.

3.3.2.4 Works debris

Works debris is a collective term for the debris that can be recovered from around the Primary Plants and consists of ferrous scrap, slag, launder sand, broken refractory brick and other residue from the iron and steel making process. The Metal Recovery Plant screens works debris to recover the ferrous and grade the remaining product, which may be used as a stabilised aggregate or used in

the landfill for forming the cells to receive wet sludges or form the final contour of rehabilitated cells.

3.3.2.5 Iron plating

Plating of molten iron from the Melters currently occurs in two circumstances, plating due to process disruption ('process iron plating') and plating for commercial sale ('commercial iron plating'):

- Process iron plating - Process plating is a contingency measure due to process issues such as plant break down, out of specification metal, scheduled or unplanned maintenance activities, or other process reasons. Given the process iron plating activities are related to process interruptions which are not always predictable, they occur on a sporadic basis – sometimes more than once a day and sometimes not for many days[29] . Given the contingency basis on which this iron plating is undertaken, its practice is minimised as far as practicable (as reflected by the Existing Consents conditions). Annual tipping rates of molten iron in recent years have been 35,800 tonnes (2018) and 28,000 tonnes (2019).
- Commercial iron plating - In October 2020, a resource consent was granted to authorise commercial iron plating, which is being undertaken to verify the commercial viability of producing plate iron in sufficient quantities to allow customers to test the material in their processes (e.g., electric arc furnaces) such that it meets the quality standards of the products' end user.

To date the process for tipping and recovery of cooled plated iron has been as follows:

- When the molten iron is poured into the tipping beds, a large surface area of molten metal is exposed to oxygen in the air. The rapid oxidation (by oxygen in the air) of the liquid iron at high temperatures forms iron oxide fume (ferric oxide or Fe_2O_3).
- Thermal buoyancy created by the hot metal lifts the plume into the air, creating a characteristic orange brown fume that is dissipated by the wind. The rate of dispersion of the cloud is highly dependent on the meteorologically conditions at the time of tipping. The fume is comprised of iron oxide particles which gives it its characteristic colour. This fume cloud is generally readily visible.

NZ Steel is currently developing a method for suppressing the fume, as described in Section 4.4.2, which is expected to be fully commissioned in 2022 and will substantially reduce the frequency the fume cloud is visible as a result of iron plating. The Commercial Iron Plating consent placed limits on the volume and frequency of this activity however, given the fume suppression will significantly reduce the discharges to air, rather than applying these volume limits going forward, it is proposed to limit the amount of iron plating that can occur unsuppressed.

3.3.2.6 RPCC tipping and recovery

The product of the Kiln process is the RPCC which is supplied to the two Melters where final reduction of the RPCC takes place to produce iron. In the event of operational problems at the Melters, or a breakdown of the RPCC transfer system, RPCC produced cannot be transferred directly to the Melters. In this situation and because the Kilns cannot easily be stopped, the Kiln output is diverted to a 700-tonne buffer storage hopper fitted with a fume collection system. However, some tipping of RPCC cannot be avoided, for example, when the buffer storage hopper is full, when the material is off-specification or when accretions are removed from the Kilns. The AQA (**Appendix F**) provides further detail regarding each of the types of RPCC.

[29] There is no restriction in the Main Air Permit on the number of occurrences per day given the sporadic nature of these discharges however there is the requirement to minimise it as far as practicable as provided for by existing Condition 12.

In recent years, in line with NZ Steel's continual improvement philosophy and aim to maximise yield, considerable reduction in RPCC losses has been achieved.

This contingency tipping of RPCC results in emissions of fine RPCC particles. RPCC particles, when exposed to moisture, will 'rust' and therefore can result in a visible plume and 'rust spotting' where particles settle. The visible plume generally disperses (or 'drops out') rapidly within the NZ Steel landholding. However, under adverse meteorological conditions this localised drop-out has been observed up to approximately two kilometres from the Operational Area. This is a characteristic of the particle itself and is an aesthetic effect (i.e., it will not degrade materials it lands on, nor does it contain hazardous material).

3.3.3 Site roads

Dust can be generated on Site from vehicle movements on both sealed and unsealed roads and yards. The primary mechanism that causes dust is the lifting of materials from the road by the vehicle wheels and the turbulent wake of air behind the vehicle. Vehicles also cause the breakdown of materials into finer particles over time, making the materials more prone to vehicle pickup. Sealed surfaces may accumulate dusty materials from windswept materials from other parts of the Site, or through tracking of dusty material by vehicles travelling from unsealed areas, or there may be wind blown dust from raw material stockpile. Unsealed roads can generate dust through the pulverisation of materials on the road surface.

There are a number of unsealed roads on Site that provide access to the raw material stockpiles, slag tipping areas and co-product/waste processing operations in the northern areas of the Operational Area. There are also unsealed roads and yards in other areas of the Site. Traffic movements over these surfaces may occur at any time, however they are most frequent during the day shift hours and weekdays. During the weekend there is a lower frequency of vehicle movement, as some co-product and waste handling/processing activities are not undertaken. With the delivery of coal in recent years also by truck, the number of vehicle movements on Site have increased.

3.3.4 Other fugitive emissions

In addition to RPCC tipping, there are a few other minor sources of fugitive emissions including from processes or equipment used in the iron and steel making facilities (known as 'fugitive process emissions'), flap lifts and melter gas flaring each of which is briefly described below.

- Fugitive emissions can be generated through processes or activities where the process is not completely enclosed and may handle light and/or dry materials. Sources can include uncovered conveyor systems, dust generated during maintenance of equipment, open ventilation of systems and co-products of chemical reactions, however the Fugitive Emissions from these sources are expected to be relatively small;
- The Kiln and MHF and their respective afterburners both have explosion flaps which lift or open for the purpose of pressure relief. A "flap lift" occurs when the gas pressure in the system reaches or exceeds a safe level for the equipment, opening the emergency vent and releasing hot un-scrubbed waste gas directly to atmosphere, this can last from less than a minute to more than ten minutes and the number of flap lifts are not necessarily proportional to the quantity of emissions. NZ Steel keep records of pressure relief flap lifts in order to monitor performance and identify issues;
- NZ Steel use natural gas and generators (including emergency generators) for supplementary electricity and heating as required. In October 2021, NZ Steel lodged an application[30] to install and operate up to 16 new generators (and to operate the two emergency generators for non-

[30] Tonkin & Taylor Ltd. Glenbrook Steel Mill – Generators and associated diesel storage. Resource consent application and assessment of effects on the environment. October 2021 (Council reference: BUN60388341).

emergency supply) for alternative power supply under an interim short-term consent. The proposed generators are expected to be operated on an intermittent basis and may not all operate simultaneously. It is proposed that this activity be incorporated into the new main air permit for the Site that is sought by this application. The locations and number of generators are detailed in the AQA. The emissions from the diesel generators are not expected to have any material impact on ambient off-site concentrations of metals, acid, Cl_2, dioxins or black carbon.

- Spontaneous combustion of coal in stockpiles can occur as a result of an oxidation process without a heat source. NZ Steel seeks to minimise the occurrence of this as it is a safety risk as well as resulting in the unnecessary loss of raw material; and
- NZ Steel also operates a landfill located to the north of the Steel Mill on Glenbrook Beach Road. The discharges to air from the landfill (principally dust) are authorised under a separate resource consent (Permit 34752) and do not form part of this application.

3.3.5 Fugitive emissions summary

Fugitive missions from the Operational Area can be characterised as being predominantly from three main sources:

1 Dust generated from vehicles travelling over roadways within the Site, particularly unsealed internal roads; and

2 Windblown dust from stockpiled materials and handling and processing of dry co-products and wastes; and

3 Fugitive emission generated from the Primary Plants and associated facilities.

The activities that are considered the most significant contributors to fugitive emissions are located in the northern yard of the Operational Area and are depicted in **Table 3.5** below.

Table 3.5: Fugitive Emission overview

Process and plants	Product used and transformed in the process	Potential contaminants
Raw materials Stockpiling and handling raw materials Co-product crushing, screening Vehicle movements Generators	Primary Concentrate (Ironsand) Limestone Coal Slag Molten iron (plate iron) RPCC Ferrous scrap Works debris Diesel	Particulates Metal oxides Nitrogen oxides (NO_x) Carbon monoxide (CO) Oxides of sulphur (SO_2 and SO_3) Carbon dioxide (CO_2) Polycyclic aromatic hydrocarbons (PAHs)

Figure 3.5: Key sources of fugitive emissions and indicative stockpile locations within northern part of the Operational Area

3.4 Summary of key air emissions from Site operations

The above sections have provided an overview of the key activities and processes undertaken at the Steel Mill as well as their corresponding discharges to air. In summary, the key discharges of contaminants to air from the Steel Mill through both point source and fugitive emissions can be categorised as follows:

- Particulate from fugitive and point sources (TSP, PM_{10} and $PM_{2.5}$)
- Combustion products including sulphur oxides (SO_x), nitrogen oxides (NO_x), carbon monoxide (CO), dioxins and polyaromatic hydrocarbons (PAHs)
- Hydrogen chlorides (HCl) and chlorine from the acid regeneration process
- Volatile Organic Compounds (VOCs) from the application of paints
- Metals including Mercury, Lead, Vanadium, Iron, Manganese, Cadmium, Arsenic, Chromium, Copper, Nickel, Zinc which can be entrained in particulate matter.

4 Site management and mitigation

4.1 Overview

The Steel Mill has well developed and long-standing management practices including systems, processes and actions that minimise discharges of contaminants to air associated with the operation of the Steel Mill. The following sections describe those systems, processes and actions including:

- An overarching Environmental Management System (EMS) certified to ISO14001;
- An Air Quality Management Plan (AQMP), setting out key responsibilities for controls;
- Point and fugitive source controls;
- Monitoring programme; and
- Complaints process and history

The Existing Consents impose requirements including contaminant limits and the implementation and adaptation of appropriate management systems[31] to ensure compliance with such limits, including regular review of methods utilised to manage environmental effects over the term of the consent. A similar approach is proposed for the replacement consent, and proposed conditions are set out in **Appendix L**.

This Section describes the existing management practices associated with the Steel Mill and also indicates where changes or improvements are proposed as a result of the assessment work undertaken to inform this application. Normally, any proposed mitigation would be incorporated into the effects section of an AEE (Section 7) to show direct correlation between effect and mitigation. However in this instance, given it is building on an existing regime, proposed amendments or additional improvements are incorporated into this section and are clearly identified where appropriate.

The Steel Mill's 53 years of operation mean that there is a long performance history and quantitative data to assess the performance of the management and mitigation systems employed at the Site.

4.2 Certified environmental management system

The key method for managing the Steel Mill's operations is the implementation of the existing EMS, which has been externally certified since 2003. The EMS is an overarching management system, embedded within NZ Steel business practices and aligned with its quality management (which is certified to ISO9001). As such, NZ Steel has a mature Integrated Management System (IMS) providing checks and balances at all levels of the organisation.

The IMS, which incorporates the EMS, is annually audited by external auditors to ensure continuing compliance with the international standards ISO14001:2015 and ISO9001:2015. NZ Steel will continue with certification to ISO14001 and an EMS is proposed as part of the condition set at **Appendix L**.

The EMS contains matter-specific management plans and protocols such as the Air Quality Management Plan (AQMP) outlined in Section 4.3. Other key aspects of the EMS include:

- Environmental Policy (issued by parent company Bluescope) and governance protocols;
- Environmental planning for continuous improvement, based on risk evaluation, compliance and strategic direction;

[31] Main Air Permit Condition 49 requires NZ Steel to maintain an Environmental Management System to ISO 14000 or an equivalent standard.

- Setting of objectives and targets to minimise air discharges, which are included in annual and medium-term plans;
- Risk assessment and management documents to reflect detailed environmental effects assessments (such as this AEE);
- Internal auditing of key environmental controls to ensure continued compliance with resource consents and the certified EMS;
- Management of change protocols to assess any proposed changes to people, processes and facilities, which may have a positive or negative environmental impact;
- Monitoring, including point source emission testing and ambient air monitoring;
- Compliance review, incident investigation and reporting to Council, NZ Steel Senior Leadership Team and Environment Committee;
- Operational roles, responsibilities and functions;
- Training and competency checks, to ensure employees are aware of resource consent and regulatory requirements;
- Procurement practices and contract conditions specifying relevant items and matters to ensure activities are compliant with resource consents;
- Equipment maintenance programs and operational procedures, including critical process checks to ensure emission control equipment continues to be fit for purpose; and
- Record keeping in relation to above matters and to demonstrate continuing compliance.

As part of the EMS, auditing of both the management practices and operational procedures are undertaken by suitably qualified experts, including both internal and external auditors. An auditors' objective is to ensure that NZ Steel is appropriately managing environmental effects. The audit program includes consideration of the continuing suitability and effectiveness of the organisational structure and administration and operational procedures, a training and competency evaluation, work areas, operations and processes.

4.3 Air quality management plan

For the purposes of this application NZ Steel has prepared an AQMP to describe the practices and procedures adopted, including the ISO14001 certified EMS, to ensure compliance with air discharge consent conditions.

The AQMP is included in the AQA (**Appendix F**). The AQMP currently sets out the requirements of Existing Consents to manage dust, particulates and other air-borne contaminants from fugitive and point-sources and it describes:

- Key personnel accountable for implementing the AQMP and their responsibilities;
- Location characteristics affecting air emissions beyond the Site boundary;
- Sources of dust and other air-borne contaminants;
- Key mitigation and prevention mechanisms and controls;
- Air quality monitoring program;
- Methods for managing incidents and complaints;
- Compliance reporting and air quality records relating to the compliance;
- Requirements for assessing the impact of changes to facilities, processes and activities;

The AQMP is intended to be a living document for the duration of the consent and it is proposed to be reviewed on a five-yearly basis (as proposed by the conditions of consent at **Appendix L**).

4.4 Source controls

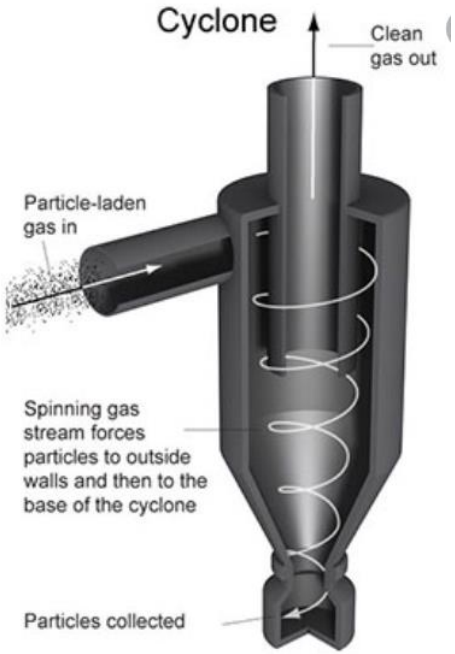
The sections below briefly describe the primary controls and systems in place for both point source and fugitive emissions. A detailed description of source controls is provided in the AQA at **Appendix F**.

4.4.1 Point source emission source controls

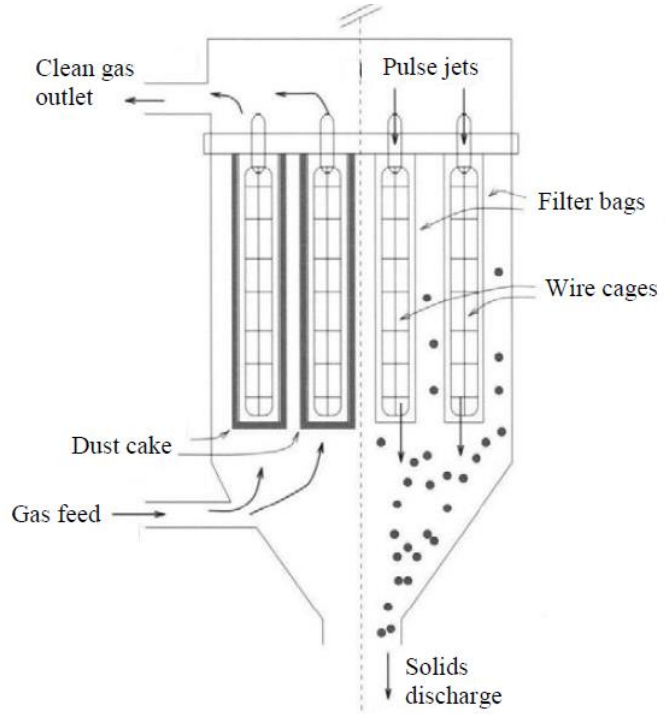
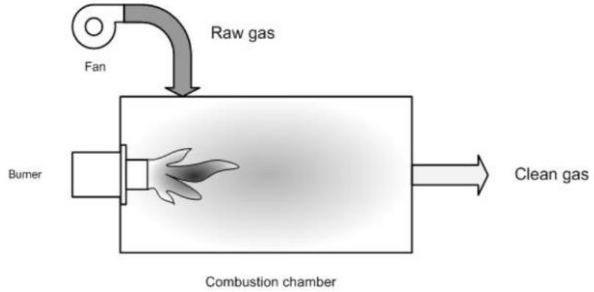
Improving air quality starts with minimising emissions at the source through optimising inputs for the greatest process efficiency and making sure the emissions are as clean as possible before they leave the process. Point source discharges enable more control over emissions. Waste gases produced by the steelmaking, rolling and coating facilities at the Steel Mill are cleaned as far as practicable before they are discharged into the atmosphere. A range of emission control equipment and mechanisms are employed across the Site to both minimise and improve the quality of point source emissions. These include, but are not limited to, those in **Table 4.1**. The AQA Report (**Appendix F**) contains further detail about each of the stacks and the current controls employed.

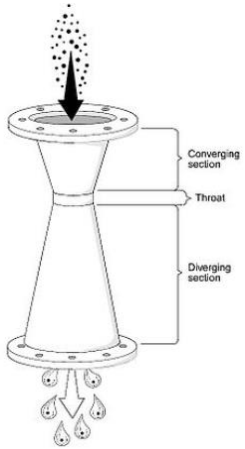
Further, the conditions of the Main Air Permit outline the emission limits and testing frequency for each major source; and requires regular inspection and maintenance of the specific emission control equipment to ensure that performance is maintained; and the discharge of contaminants is recorded, reported and controlled. Similar conditions are proposed for the replacement consent sought by this application (see **Appendix K**).

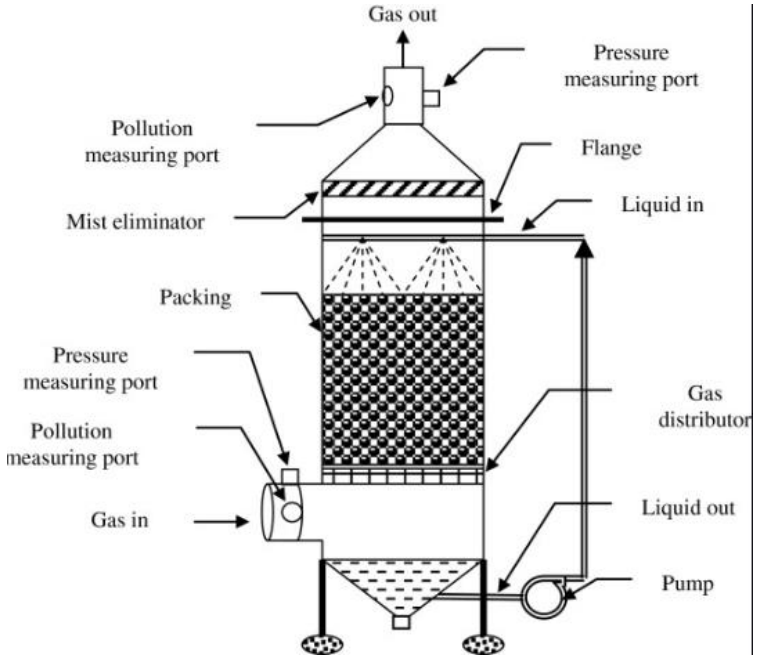
Table 4.1: Major pollution control devices used at the Steel Mill

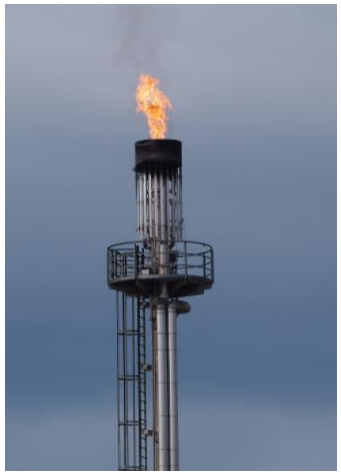
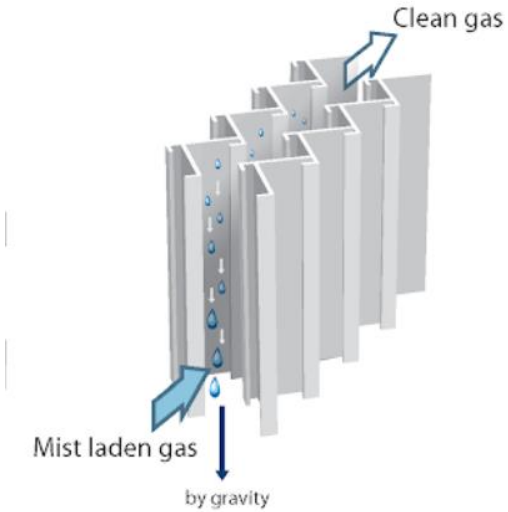
Pollution control device	Description	Example image	Where these controls are used in the process
Cyclone	A type of separation device (dry scrubbers) that use the principle of inertia to remove particulate matter from gases. Cyclone separators are one of many[32] air pollution control devices known as pre-cleaners since they generally remove larger pieces of particulate matter. Wet hydrocyclones are used to remove slurry droplets downstream of some scrubbers at NZS.		Multi-hearth furnaces (dry and wet) Kiln Waste Gas (wet) Melter Waste Gas (wet) Melter Millscale additions

[32] https://energyeducation.ca/encyclopedia/Air_pollution_control_devices

Pollution control device	Description	Example image	Where these controls are used in the process
Baghouses	Are air pollution control devices designed to use fabric filter tubes, envelopes, or cartridges to capture or separate dust and other particulate matter (PM). Also known as fabric dust collectors or fabric filters.		Melter slags tapping fume Melter iron tapping fume Steel Plant additives system Acid regeneration plant Primary concentrate drier baghouse Iron plant lime silo/ lime transfer system Melter concentrate/additives The KOBM secondary baghouse works on the same principal but has a different design.
Incineration / Afterburner	Flue gases, along with the required quantity of combustion air, are brought to a high temperature. In thermal after burning. The gases are kept at a high temperature for a long enough period of time, whereby pollutants (VOCs, CO) are oxidised with oxygen into CO_2, H2O, NO_X, SO_X		Waste gases leaving the MHF's and Kilns are passed through their respective afterburners Paint Line Incinerators

Pollution control device	Description	Example image	Where these controls are used in the process
Venturi scrubber	A type of wet scrubber, the Venturi Scrubber uses the Venturi effect which occurs when the gas is pushed through a throat, or choke, increasing the velocity of the gas stream. A scrubbing liquid (such as water) is added at the throat and is distributed through the high-speed gas stream. Venturi scrubbers are most effective for removal of particulate (as opposed to gaseous contaminants) as particulate is readily trapped by contact with liquid. These devices are typically installed in series with a cyclone (or similar) to remove the liquid droplets.		Melter off-gas system Melter charging dedusting system RPCC hopper dedusting system MHF Pan conveyors

Pollution control device	Description	Example image	Where these controls are used in the process
Spray Tower	A type of Wet scrubber, the Packed tower scrubbers are towers containing a bed of packing material. The packing material provides a large, wetted surface for gas-liquid contact to remove a variety of pollutants from exhaust gas from furnaces or other devices. These devices use a scrubbing liquid to remove the pollutants. The exhaust gas is moved through the scrubbing liquid and the liquid is misted through the gas.		Pickle line scrubber ARP scrubber Metal Coating Line cleaning section stack Metal Coating Line chromate treatment stack

Pollution control device	Description	Example image	Where these controls are used in the process
Flaring	Flare gas systems are used to manage waste gas that cannot be efficiently captured and returned to the system for processing. Similar in function to an afterburner, the ignition of the combustible gases at the flare causes the oxidation of gaseous pollutants (such as VOCs or CO) to lesser pollutants such as CO_2, H2O and NO_X.		KOBM Flarestack Consumption line flarestack Melter flarestack
Mist eliminator (Chevron and packed type)	Removes liquid droplets and mists from air streams. While both types are used the chevron is the most common at the Steel Mill.		In the Rolling Mills, at the Combination mill Reversing mill Strip oiler Bearing washer KOBM off-gas system Hot pan conveyor scrubber Kiln scrubber Acid regeneration (both types)

4.4.2 Fugitive/intermittent emission mitigation

Fugitive emissions control are an important part of Site management, to achieve good environmental performance. **Table 4.2** summarises the existing, or proposed controls, for the key sources of Site fugitive emissions. Where actions or controls have been implemented recently, or are to be implemented in the near future, these are in bold text. This is to demonstrate those measures that will not have, as yet had a mitigating impact on fugitive emissions.

NZ Steel has a focus on continual improvement for reducing, control and management of fugitive emissions. As outlined in the AQA (**Appendix F**) many of the following controls are best practice and others are the best-practicable-option, given the type of materials and location of the activity with respect to the Site boundary and sensitive receptors (discussed further in Section 8).

Table 4.2: Key fugitive emissions controls

Source of Emission	Mitigation / Control
All sources	Separation distance – the NZ Steel landholdings (the Site) surrounding the Operational Area provides an important buffer zone between the Steel Mill and neighbouring properties. By increasing the distance of a potential sensitive receptor from the source of the air discharges, the effects experienced can be smaller than what would otherwise occur if they were closer to the source. Existing Site boundary vegetation provides screening and some filtration of coarser dusts, near ground level.
Co-product and works debris processing and stockpiling	Height of stockpiles is managed to maintain the minimum practicable height, particularly where material placed on or recovered from a stockpile is undertaken at the top of the stockpile. Processing areas and stockpile location for the finer dry materials, such as KOBM Slag, works debris and other co-products, are situated to minimise wind shear and water sprays applied for dust suppression, where practicable. Minimising stockpiling of material to be processed in Metal Recovery Plant and co-product screening areas. Minimising stockpiling of processed materials, before reuse in Primary Plants or sale. Housekeeping (such as containment of stockpile margins) and unsealed road maintenance in stockpile areas and yards (such as removal of fine material from roads and regular resurfacing with appropriate roading material). **Improvement to recycled water pumping pressure to provide for more effective dust suppression sprays on tipping banks and around co-product processing areas (potentially from late 2021).**
Coal and Primary Concentrate stockpiles and handling	Enclosed conveyors for transfer of coal, Primary Concentrate and limestone. **Fixed water sprays are being trialled for drier coal stockpiles.** The height of stockpiles is managed to maintain the minimum practicable height to limit dispersion and located to minimise wind shear. Housekeeping in yards, such as containment of stockpile margins and when yards are empty, full maintenance program to remove fine materials back to stabilised yard surface. Unsealed road maintenance in stockpile areas and yards (such as removal of fine material from roads and regular resurfacing with appropriate roading material)
Ferrous scrap – rationalising movements and handling	**Consolidation of ferrous scrap and works debris stockpiling and processing areas, to minimise large vehicle on unsealed roads**. Housekeeping (such as containment of stockpile margins) and unsealed road maintenance in stockpile areas and yards (such as removal of fine material from roads and regular resurfacing with appropriate roading material).

Internal roading - Sealed roads	A wheel wash was installed (June 2020) 500 metres from the North Gate (Weighbridge Road Exit) for trucks leaving unsealed internal roads and exiting onto Brookside Road. This portion of sealed road has the highest volume of movements for vehicles exiting the Site. Sweeper operation for all sealed roads – **a new high-tech sweeper was commissioned September 2020.** Rationalisation of large operational vehicle movements at the northern Site weighbridge to minimise movements in unsealed areas and to avoid carryover onto sealed internal road (sealed 2019). Where internal unsealed roads and yards exit onto sealed roads, the apron is stabilised to minimise carryover. **This is to be progressively extended as existing sealed roads are resealed and current unsealed roads are sealed.** Repair of sealed roads and resealing of internal roads. **In April 2021 a major sealed road (Road 50), used by many operational vehicles daily, is to be resealed and exits from the Iron Plant roads onto Road 50 are to be established.** **Redesign of existing catch-pits for water treatment sludges is planned (timeframe yet to be determined) to avoid carryover onto Road 50.**
Internal roading - Unsealed roads	Regular maintenance of unsealed roads and yards, with appropriate materials (e.g. bound aggregate produced by NZ Steel) to minimise pot-holing and to provide a surface where excessive dust is minimised. Daily deployment of watercarts for dust suppression. **Two new high-capacity water carts were commissioned in June 2020 and January 2021.** **Quick-fill water tanks to be installed mid-2021 to provide for quicker turnaround of the high-capacity water carts.** Large vehicle speeds limited in unsealed areas. Stabilising of unsealed surfaces using chemical dust suppressant application, which provides for greater coverage of the Site each day. **One major unsealed road (approximately 400 metres) due to be sealed in mid-2021 with stabilised aprons from exits leading onto this newly sealed road.** Housekeeping in stockpile areas and yards (such as containment of stockpile margins) to avoid carryover onto unsealed and internal sealed roads.
RPCC tipping	Tipping of prime RPCC only occurs as a contingency operation when required. A 700 tonne hopper is used for storage of prime RPCC, to avoid tipping during process disruptions. Reduction in prime and off-specification RPCC material tipped since 2016 due to changed operational control, particularly during Kiln start-up and lowering Melter feed iron content acceptance criteria. NZ Steel has a keen focus on further operational efficiencies and plant reliability to reduce the amount of RPCC tipping required. **Planned design and installation of an in-stream crusher adjacent to kiln discharge, to avoid the need to tip a large portion of RPCC in the open excavated pits.** Operational focus on reducing RPCC accretions (boulder like material formed in kilns which cannot pass to storage hopper, or Melters. **Improvement to recycled water pumping pressure to provide for more effective dust suppression sprays on tipping banks and around co-product processing areas (potentially from late 2021).**
Iron plating	Minimisation of process disruption plating operations where possible. **Installation and commissioning of a new fume suppression system to occur from mid-2021[33]. The AQA provides a schematic and further detail on how the system works but**

[33] It is noted that the fume suppression technology developed for iron plating would not be effective for other fugitive emissions from tipping activities such as slag tipping or RPCC tipping because the emissions from these activities are predominantly particulate, rather than metal oxides as produced in iron tipping.

	in summary, molten iron will be poured into the tipping bed via a chute, in an inert atmosphere to reduce oxidation and resulting fume cloud. It is proposed as a condition of consent to require that a minimum of 90% of all metal tipped for iron plating purposes (resulting from process disruption or for Commercial Iron Plating) will be fume suppressed within 12 months of the grant of consent[34].
Dust and fume capture systems	Many fugitive emission sources in the Iron and Steel Plant are controlled using conveyor covers, extraction systems and hoods and enclosures, which enable capture of fugitive emission and fume. Scheduled equipment maintenance, daily inspection and visible monitoring, to ensure equipment is operating correctly and avoid/minimise fugitive fume and dust. **Steel Plant baghouse filter design modification and fume capture system modification to improve capture, underway with implementation potentially from late 2021.**
Waste handling and landfill	Waste handling methods to minimise/avoid dust generation, including wetting of dusty materials, location of activities and associated stockpiles to minimise wind shear and material transfer. **Early 2021 – Install fixed water sprays for dust suppression at Landfill.** While the landfill does not form part of the scope of this resource consent application, the mitigation of fugitive emissions will help reduce overall dust contributions at the Steel Mill.

Due to the size and variety of activities across Site, it is impractical to include specific consent conditions for each source or process within the Main Air Permit. Instead, the existing Main Air Permit requires procedures for managing, mitigating and controlling fugitive emissions. This is proposed to continue for the replacement consent sought and will be detailed in NZ Steel's AQMP (which is informed by the EMS). A draft of the AQMP is appended to the AQA (**Appendix F**) and an overview of the requirements of the AQMP is provided in the proposed conditions for the replacement consent (**Appendix L**).

4.5 Monitoring Programme

Ambient monitoring, as described in Section 4.5.2, is key to measuring and understanding the effectiveness of the previously mentioned controls for fugitive emissions. NZ Steel undertakes a range of contaminant monitoring both at point sources (stack emission testing) and ambient monitoring within and beyond the boundary of the Site. Some of this monitoring is required as a condition of the Main Air Permit, however, additional monitoring has been undertaken to provide a more complete understanding of the effects of discharges from the Operational Area.

Specific conditions (27-30) of the Main Air Permit require ambient dust is measured and recorded appropriately. Conditions 31 and 32 for ambient monitoring include Investigation Trigger Levels for particulate where, if triggered, an investigation occurs. Subsequently, if an activity on the Site is the cause of elevated levels of particulate at the monitoring location, then NZ Steel is required to undertake action to reduce the discharge. Similar conditions are proposed for the replacement consent at **Appendix L**.

The existing monitoring programme is described below, and Section 4.5.3 sets out proposed changes to the monitoring programme as part of this replacement consent application.

4.5.1 Stack emission monitoring

The stack emission testing is predominantly a method of ensuring the emission control equipment and process operations are working properly. In this context, the limit levels imposed by the existing

[34] For context, it is noted that the remaining 10% of hot metal tipped for iron plating purposes that may be visible (i.e., have no fume suppression) equates to less than 1% of all hot metal tapped at the Melters. Prior to the introduction of fume suppression, the long-term average for tipping with no fume suppression was around 4% of all hot metal tapped.

Main Air Permit conditions reflect what is expected from good performance and are generally below the threshold that would cause adverse effects.

The existing Main Air Permit requires regular stack emission monitoring (set out in Condition 23) for TSP, NOx and CO. **Table 4.3** provides a summary of the existing stack emission monitoring. NZ Steel is proposing adjustments to this monitoring program, as set out in Section 4.5.3.

Table 4.3: Existing stack testing schedule

Source ID	Source Name	Contaminant			
		Particulate Matter (TSP)	NO_x	CO	HCl/CL_2
IP1-4	Multi-hearth furnace stacks	6-monthly	Annual	-	-
IP23-26	Kiln stacks	6-monthly	-	6-monthly	-
IP32	Melter Slagside Baghouse	3-monthly	-	-	-
IP33/34	Melter Metalside Baghouses	3-monthly	-	-	-
SP1	KOBM Flarestack	3-monthly	Annual	-	-
SP4	Steel Plant (KOBM) Baghouse	6-monthly	-	-	-
CSM1	Acid Regeneration Plant	-	-	-	3-monthly
CSM3	Pickle Line scrubber	-	-	-	Annual
HSM1	Slab Reheat Furnace	-	Annual	-	-
SR1	Primary concentrate drier baghouse	6-monthly	-	-	-

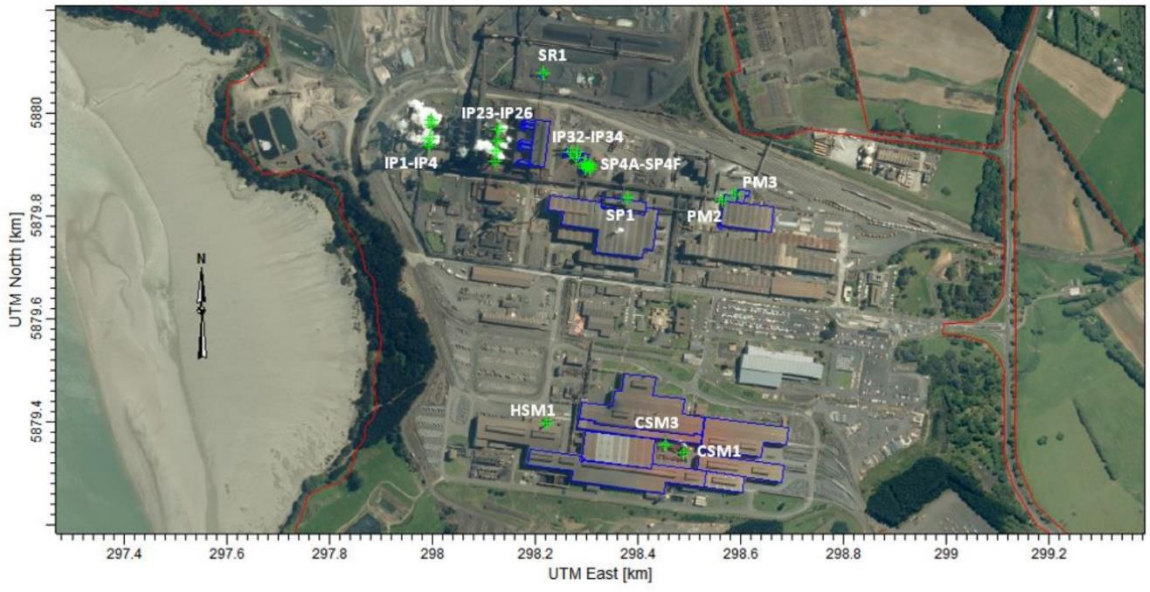


Figure 4.1: Major stack locations (identified in green)

4.5.2 Ambient air quality monitoring

NZ Steel undertakes ambient air quality monitoring at six locations (shown in **Figure 4.2**) as required by the existing Main Air Permit. This monitoring covers a range of key contaminants associated with discharges from the Site (set out in Conditions 27 to 32), along with additional contaminants of interest to enable an understanding for this application. In the case of particulate matter, monitoring data spans over a decade and for most other contaminants there is at least 2 years of monitoring data. The AQA (**Appendix F**) describes in detail the monitoring that has occurred.

Each of the monitoring sites is described below:

- The Training Centre (Site 3) is located within the Site, directly downwind of the predominant wind direction (with west to southwesterly winds).
- 64 Glenbrook Beach Road (Site 20), NZS Northern Boundary (Site 4B) and Glenbrook School (Site 17) are representative of off-site air quality at varying distances and downwind directions from the Steel Mill. Monitoring at 64 Glenbrook Beach Road (Site 20) is also downwind of the predominant wind direction and is very near the boundary of the Site. For these reasons, the 64 Glenbrook Beach Road (Site 20) monitoring site is considered to be broadly representative of air quality that might be experienced at the closest residential dwellings to the Site, for example the houses along Reg Bennett Road and the closest houses on Glenbrook Beach Road.
- The monitoring sites at Boundary Road (Site 18) and Sandspit Reserve (Site 19) are located sufficiently far from the Site that they are not expected to be impacted by emissions from the Steel Mill. Therefore, these two monitoring locations are considered to generally represent background ambient air conditions. Sandspit Reserve (Site 19) is located on the northern edge of Waiuku township and is impacted by urban sources such as domestic heating emissions. Boundary Road (Site 18) is located in a remote rural location and is principally affected by non-anthropogenic sources (such as sea spray) and agricultural activities.

Figure 4.2: NZ Steel Site and Operational Area relative to the ambient air quality monitoring sites

The existing Main Air Permit also sets Investigation Trigger Levels for investigation of possible dust sources for both TSP and PM_{10} (set out in Conditions 31 and 32). These Investigation Trigger Levels are:

- TSP: 80 µg/m^3 (24 hour average) at the Training Centre (Site 3) and Boundary Road (Site 18) monitoring sites;
- PM_{10}: 33 µg/m^3 (24 hour average) at Glenbrook School (Site 17) or 50 µg/m^3 (24 hour average) at the 64 Glenbrook Beach Road (Site 20) or Sandspit Reserve (Site 19) monitoring sites.

Measurements above these trigger levels requires certain responses from NZ Steel, including an investigation into the cause of the elevated dust levels and whether it could be attributable to Steel Mill activities. In the case of an elevated PM_{10} levels being attributed to the Steel Mill operations, NZ Steel is required to prepare and submit a remedial action plan within three months of the occurrence, detailing methods to reduce the PM_{10} levels to below specified levels.

These Investigation Trigger Levels are 24-hour averages and are consistent with the current good practice guideline for moderately sensitive environments that require management of chronic dust. However, given the longer averaging period, the current trigger levels are considered reactive it would be more appropriate to use a 1-hour average of 250 µg/m^3 for TSP at the NZS Training Centre (Site 3), as recommended in current good practice guidelines.

As described in Section 4.5.3.2 below, it is proposed to change the trigger levels currently required by the Main Air Permit to align with the good practice guidance as part of the replacement consent (see the proposed conditions in **Appendix L**).

4.5.3 Proposed changes

4.5.3.1 Stack emissions monitoring

Based on the findings of the AQA (**Appendix F**), a number of changes to the existing stack emission monitoring programme (Condition 23 of the Main Air Permit) have been recommended. All of those recommendations have been included in the proposed conditions of consent for this application (**Appendix L**) and include:

- TSP testing conditions updated to $PM_{2.5}$ for Primary Plants baghouses;
- Removal of requirement to test small sources, such as the primary concentrate drier baghouse;
- Removal of HCl monitoring conditions at ARP, based on stack tests and modelling;
- Removal of KOBM flarestack as stack testing presents a significant safety hazard to personnel.

No change is proposed to the consent limits on the MHF stacks and Kiln stacks, as there is only a small margin to the maximum measured concentrations. It is not possible to change the consent limit to a $PM_{2.5}$ limit as the emissions are controlled by wet scrubbers and it is not practical to undertake size-fractionated testing.

4.5.3.2 Ambient air quality monitoring

In accordance with Conditions 28 and 29 of the Main Air Permit, the ambient air monitoring programme has been established over time and in consultation with Council. NZ Steel has initiated additional ambient monitoring periodically to remain informed of its contribution to off-site ambient air quality and to support this application. The proposed conditions of consent for this application (**Appendix L** provide for the ambient air quality programme to continue, subject to the following proposed changes to reflect updates in best practice and the findings of the AQA:

- Include a requirement for $PM_{2.5}$ (as well as PM_{10}) monitoring at 64 Glenbrook Beach Road (Site 20);
- Change the monitoring at Boundary Road (Site 18) from TSP to PM_{10}, to provide a background site for comparison with the results from the 64 Glenbrook Beach Road (Site 20) site;
- Decommission the PM_{10} monitoring site at Sandspit Reserve (Site 19), as this site has not shown any material influence of emissions from the Steel Mill and does not provide useful information (as it appears to experience abnormal wind conditions);
- Decommission the monitoring site at Glenbrook School (Site 17), as all monitoring to date has shown excellent to good performance with all assessment criteria for the protection of human health; and
- Revise the trigger investigation level system to reflect the current good practice guidelines.

4.6 Complaints process and history

NZ Steel maintains a complaint procedure for timely and appropriate response to any environmental complaints. This includes a (confidential) register of the location of the complainant, the nature of the complaint and any actions taken to investigate and resolve the complaint. The internal complaints procedure ensures that concerns reported to NZ Steel are reviewed and are reported to Auckland Council (as set out in conditions of the Main Air Permit). Complaints are also reported on at the Environment Committee, which currently meets three times a year.

In general, an average of four complaints per year have been received. These generally relate to dust, noise and traffic, although they are not all necessarily related to Steel Mill activities.

The nature of the complaint will determine the actions taken, however all complaints relating to the Steel Mill operations are handled through NZ Steel's Environmental Team. In general, once a complaint is received a visit to the complainant is arranged to view and discuss the nature of the complaint. If applicable, samples are collected for analysis to assist in determining if the Steel Mill is likely responsible. This will then determine the steps taken to resolve the issue. This is done formally with letters and documented as part of NZ Steel's EMS.

5 Resource consent requirements

The requirements for resource consents are determined by the rules in the AUP. The rules which apply are determined by the zoning of the Site, any identified notations in the plan and the nature of the activities proposed.

5.1 Zoning and planning notations

Table 5.1 identifies the zoning and planning notations that apply to the Site. **Figure 2.3** above shows the applicable AUP zones and a copy of the AUP Planning Maps which show the locations of the overlays are included in **Appendix C**.

Table 5.1: Zoning and planning notations

	Zoning/planning notation	Location
Zoning	Business – Heavy Industry Zone	Covers most of the Site south of Brookside Road including the entire Operational Area.
	Rural – Mixed Rural Zone	Applies to the land within the Site to the north of Brookside Road (except land directly adjacent the Waiuku Estuary).
	Rural - Rural Production Zone	Applies to the area of land within the Site on the eastern side of Mission Bush Road.
	Rural – Rural Coastal Zone – Manukau Harbour	Applies to land north-west of the Site adjacent to the Manukau Harbour (outside of that identified for Business – Heavy Industrial zone).
Precinct	Glenbrook Steel Mill Precinct	Applies to the same area as the Business – Heavy Industry Zone.
Overlays	Natural Resources: Significant Ecological Areas Overlay [rp] SEA_T_5329 and SEA_T_5330	Applies to two small areas at the south-eastern extent of the Site.
	Natural Resources: High-Use Aquifer Management Areas Overlay [rp] – Waiuku Kaawa	Applies to the whole Site and wider area.
	Natural Resources: High-Use Aquifer Management Areas Overlay [rp] – Glenbrook Volcanic	Applies to part of the Site to the north and east.
	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp] – Franklin Volcanic Aquifer	Applies to part of the Site to the north and east.
	Infrastructure: National Grid Corridor Overlay – National Grid Yard Uncompromised; National Grid Subdivision Corridor; National Grid Substation Corridor	Applies to the north-eastern part of the Site.
Controls	Controls: Coastal Inundation 1 percent AEP Plus 1 m Control – 1 m sea level rise	Applies to a small area along the coast of the Site.
	Controls: Macroinvertebrate Community Index – Exotic; Native; Rural; Urban	Each index varies across the Site.

5.2 Explanation of discharge rules

This application seeks authorisation for the ongoing discharge of contaminants into air, under section 15 of the RMA. The rules in the AUP that apply to these discharges are found in Activity Table E14.4.1 of Chapter E14 (Air Quality).

Table E14.4.1 sets out the activity status for activities, dependent on the spatial area within which the site of proposed discharges is located. The Steel Mill is located within the Business – Heavy Industry Zone and therefore the relevant column in Table E14.4.1, as specified in E14.4(2), is "Low air quality – dust and odour area (Industry)". Therefore, the activity status identified for each reason for consent in **Table 5.2** below is the activity status attributed to "Low air quality – dust and odour area (Industry)".

5.3 Reasons for consent

Table 5.2 below sets out the reasons consent is sought. For the avoidance of doubt, NZ Steel is seeking resource consent under the rules identified below and any other air discharge consents necessary to authorise the activities described in the application, even if not specifically noted, including under any future National Environmental Standards.

Table 5.2: Resource consents required

Proposed activity	Rule description and assessment	Activity status
Discharging contaminants to air (RMA section 15)		
Discharge of contaminants to air from the production of inorganic chemicals	E14.4.1(A22) Production of inorganic chemicals, including concentration of acids or anhydrides, ammonia or alkalis. **Comment:** The regeneration of HCl in the Acid Regeneration Plant could be considered to be included in this rule. A conservative approach has been taken and consent is sought pursuant to this rule.	Discretionary
Discharge of contaminants to air from the processing or treatment of organic or inorganic compounds	E14.4.1(A29) Production, processing or treatment of organic or inorganic compounds. **Comment:** While acid recovery is addressed by (A22) above, this rule covers any other chemical process that results in discharges to air. A conservative approach has been taken and consent is sought pursuant to this rule.	Discretionary
Discharges to air from the manufacture of iron from Primary Concentrate (ironsand) and coal at the Iron Plant (MHFs, Kilns, Melters)	E14.4.1(A40) The extraction, including electrochemical methods of reduction, of any metal or metal alloy from its ore, oxide or other compounds. **Comment:** The production of molten iron from Primary Concentrate (ironsand) could be considered to be included in this rule, however this process is also captured under (A41). Notwithstanding this, a conservative approach has been taken and consent is sought pursuant to this rule.	Discretionary

Proposed activity	Rule description and assessment	Activity status
Discharges to air from the manufacture of steel and steel alloys.	E14.4.1 (A41) The manufacture of steel, the refining of any metal, or the modification of any alloy in the molten state. **Comment:** NZ Steel manufactures steel and steel alloys from Primary Concentrate (ironsand) and coal.	Discretionary
Discharge to air from the melting of metal and metal alloy.	E14.4.1 (A42) Melting of any metal or metal alloy with a melting capacity of more than 1t/hour. **Comment:** NZ Steel produces a range of alloyed steels and the rate of melting metal alloy at the Site is greater than 1 tonne per hour.	Discretionary
Discharges to air from galvanising processes undertaken (passing steel strips through a bath of molten zinc at the Metal Coating Line).	E14.4.1 (A43) Galvanising. **Comment:** The metal coating operation is performed by passing the steel strip directly from the exit of the annealing furnace into a bath of either molten zinc or Zincalume® (a mixture of aluminium and zinc) – a galvanising process.	Discretionary
Discharges to air from combustion sources	E14.4.1 (A54) Combustion activities not meeting the permitted, controlled or restricted discretionary activity standards. **Comment:** A number of small, medium and large combustion activities are undertaken on the Site including, but not limited to: • Paint line incinerators • Kilns cogeneration plant • Slab reheat furnace • KOBM and CCM ladle preheaters • Acid Regeneration Plant • Emergency Diesel Alternators The majority of the combustion activities are fuelled by waste gases, natural gas (or diesel in the case of backup generators). Given the number of combustion activities, a conservative approach has been taken to apply for consent as a discretionary activity for all combustion activities cumulatively.	Discretionary
Discharges to air from flaring activities occurring at the melter and KOBM flarestacks.	E14.4.1 (A57) Flaring of gas, excluding landfill gas, including biogas and petrochemical products **Comment:** NZ Steel undertakes flaring of gas the KOBM and the Melters. The KOBM produces flammable gas for a short period during each batch of steel. Melter gas is flared as a contingency measure for pressure control or when it cannot be utilised at the cogeneration facilities on site.	Discretionary

Proposed activity	Rule description and assessment	Activity status
Discharges to air from the drying of solvent-based paints in the prime and finish ovens (both of which have an associated afterburner for destruction of VOCs).	E14.4.1 (A62) Drying, curing or baking of any organic solvent-based coating onto a surface by application of heat at a solvent VOC application rate of more than 20kg VOC/hour where discharges to air pass through an afterburner. **Comment:** Solvent VOC application rates are variable, and have not been specifically calculated but, for the purposes of determining compliance with the rule (taking into consideration the requirements of Standard E14.6.3.3), will exceed 20 kg VOC per hour. The VOC emissions from both the Prime and Finish Paint Lines are treated through afterburners.	Restricted Discretionary
Discharges to air from the outdoor storage of more than 500 tonnes of coal or coal products.	E14.4.1 (A81) Coal or coal products storage outdoors of more than 500 tonnes. **Comment:** Coal is a key component of the steel making process and is stockpiled on-site in volumes exceeding this tonnage.	Discretionary
Discharges to air from crushing of ore and aggregates through the processing of co-products (slag processing).	E14.4.1 (A94) Crushing of concrete, masonry products, minerals, ores and/or aggregates (not associated with quarrying activities) at a rate: • Greater than 60 tonnes/hour; or • Up to 60 tonnes/hour and not meeting the permitted activity standards **Comment:** The processing of co-products occurs at a rate greater than 60 tonnes/hour.	Restricted Discretionary

Table 5.3 provides an assessment of both permitted activities undertaken on the Site as well as activities that are considered to be related, but not applicable, for completeness.

Table 5.3: Permitted Activities and not applicable rules

Proposed activity	Rule description and assessment	Activity status
Discharges to air from the use (including testing and maintenance) of emergency generators.	E14.4.1 (A48) Emergency generators used for the purpose of generating electricity for premises during mains power unavailability (includes operation for the purpose of generator testing and maintenance). **Comment:** There are no activity specific permitted activity standards and therefore the general standards at E14.6.1.1 apply. The use of emergency generators will meet the standards of E14.6.1.1(1) – (3) and (4) is not applicable.	Permitted

Proposed activity	Rule description and assessment	Activity status
Discharges to air from engines of motor vehicles and other mobile sources[35]	E14.4.1 (A114) Discharges to air from the engines of motor vehicles, or from aircraft, trains, vessels (including boats) and mobile sources not otherwise specified (such as lawnmowers), including those on industrial or trade premises (excluding tunnels). **Comment:** E14.6.1.1 General standards do not apply to mobile sources therefore there are no applicable permitted activity standards for this activity to be assessed against. This rule is related to vehicle emissions (resulting from motor combustion processes).	Permitted
Discharges to air from the ventilation, displacement and dispensing of motor fuels	E14.4.1 (A120) Air discharges of volatile organic compounds (including organic solvents) from: a dispensing of motor fuels; or b ventilation or displacement of air or vapour from storage tanks containing motor fuels; or c ventilation or displacement of air or vapour from motor fuel tankers (excluding petrol vapour) **Comment:** Diesel fuel is stored on-site in tanks. The Permitted Activity Standards of E14.6.1.19 are only relevant to petrol and are therefore not applicable.	Permitted
Discharge of volatile organic compounds to air from the application of surface coatings or printing ink, without the application of heat to an equivalent of more than 20kg/hour or 10t/year.	E14.4.1 (A4) Any process that discharges more than 20kg/hour or 10t/year of volatile organic compounds such as largescale application of surface coatings or printing ink without the application of heat, excluding the ventilation, displacement or dispensing of motor fuels and excluding road marking. **Comment:** It is considered that Rule E14.4.1(A62) covers the discharge of VOCs from the Paint Lines and that no other large-scale application of VOCs occurs outside of these processes that would warrant (A4) to be applicable.	Not Applicable
Discharge of contaminants from the melting of metal or metal alloy	E14.4.1(A9) Melting of any metal or metal alloy at a rate between 100kg/hour and 1t/hour excluding welding and jewellery manufacture. **Comment:** All melting of metal and metal alloy (including metals from recovery activities such as tipped slag and plated iron) are considered to be cumulatively covered under Rule (A42).	Not Applicable

[35] While not defined under the AUP, the former Auckland Air, Land and Water Plan defines 'mobile sources as "a mobile source that discharges contaminants into air such as motor vehicles (cars), aircraft, trains, vessels (boats, and lawn mowers)."

Table 5.4 below provides an assessment of the applicable activity standards.

Table 5.4: Activity standards assessment table

Activity	Rule	Standard	Status	Comment
Restricted Discretionary Standards				
Drying and Kiln processes	E14.4.1 (A62) Drying, curing or baking of any organic solvent-based coating onto a surface by application of heat at a solvent VOC application rate of more than 20 kg VOC/hour where discharges to air pass through an afterburner	E14.6.3.3. (1) The solvent VOC application rate must be calculated from the proportion of the coating material that is a VOC (taking into account the volatility under the particular conditions of use) multiplied by the total application rate of the coating material.	Complies	Solvent VOC application rates are variable, and have not been specifically calculated but, for the purposes of determining compliance with the standard, will exceed 20 kg VOC per hour. The VOC emissions from both the Priming and Finishing ovens are treated through afterburners.
		E14.6.3.3. (2) For clarity, all substances that are subjected to temperatures in excess of their boiling point shall be considered volatile under the conditions of use.	Complies	Solvent VOC application rates are variable, and have not been specifically calculated but, for the purposes of determining compliance with the standard, will exceed 20 kg VOC per hour. The VOC emissions from both the Priming and Finishing ovens are combusted at sufficient temperature and residence time for VOC destruction.

5.4 Summary of reasons for consent

Based on the above assessment, consent for air discharges associated with the Steel Mill is sought from the Council as a discretionary activity pursuant to section 15 of the RMA for the following reasons:

- Discharge of contaminants to air associated with the recovery of HCl at the Acid Regeneration Plant pursuant to Rule E14.4.1(A22) as a discretionary activity.
- Discharge of contaminants to air associated with any other chemical processes that results in discharges to air pursuant to Rule E14.4.1(A29) as a discretionary activity.
- Discharge of contaminants to air associated with the production of molten iron from Primary Concentrate (ironsand) pursuant to Rule E14.4.1(A40) as a discretionary activity.
- Discharge of contaminants to air associated with the manufacture of steel and steel alloys pursuant to Rule E14.4.1(A41) as a discretionary activity.
- Discharge to air from the melting of metal and metal alloy pursuant to Rule E14.4.1(A42) as a discretionary activity.).
- Discharges to air from galvanising processes pursuant to Rule E14.4.1(A43) as a discretionary activity.
- Discharges to air from combustion sources pursuant to Rule E14.4.1(A54) as a discretionary activity.
- Discharges to air from flaring activities occurring at the Melter and KOBM flarestacks pursuant to Rule E14.4.1(A57) as a discretionary activity.
- Discharges to air from the drying of solvent-based paints in the Paint Line prime and finish ovens where discharges pass through an afterburner pursuant to Rule E14.4.1(A62) as a restricted discretionary activity.
- Discharges to air from the outdoor storage of more than 500 tonnes of coal or coal products pursuant to Rule E14.4.1(A81) as a discretionary activity.
- Discharges to air from crushing of ore and aggregates through the processing of co-products (slag processing) pursuant to Rule E14.4.1(A94) as a discretionary activity.

For the avoidance of doubt, NZ Steel is seeking resource consent under the rules identified above and any other air consents necessary to authorise the activities described in the application, even if not specifically noted, including under any future National Environmental Standards.

6 Approach to health, nuisance and ecological assessment

This Section provides a summary of the way the assessment of health effects, nuisance effects and ecological effects has been approached.

Section 6.1 outlines the approach that has been taken to quantify the Steel Mill discharges including using monitoring data (stack emission and ambient), dispersion modelling and metals exposure pathways (including filter testing and drinking water sampling).

Section 6.2 then provides an overview of the assessment criteria or standards, which set guideline values for air quality and are considered to be appropriate for protecting people and ecosystems from significant adverse effects.

The results obtained using the assessment methods outlined in Section 6.1 are then compared to the assessment criteria set out in Section 6.2. This has enabled the discussion on the actual and potential effects set out in Section 7 below.

6.1 Assessment method

A range of methods have been used for assessing the effects of the air discharges from the Steel Mill including:

- Quantitative data from stack emission testing, ambient monitoring, deposition gauges, TSP filter samples and drinking water sampling; and
- Dispersion modelling – a CALPUFF air dispersion model.

6.1.1 Stack emission monitoring

The Main Air Permit[36] requires regular stack emission monitoring for TSP, NO_x and CO, as described in Section 4.5.1.

The stack emission sources identified in **Table 4.3** and **Figure 4.1**, are tested for TSP, which is a measure of the total concentration of particulate matter in the emission (including particles greater than 10 microns).

In addition to what is required by the Main Air Permit, NZ Steel has recently undertaken stack emission testing to determine the indicative ratios of PM_{10} or $PM_{2.5}$ to TSP. This ratio can be used to infer $PM_{2.5}$ and PM_{10} emission concentrations from the larger historical TSP monitoring dataset. It is noted that it is not possible to undertake size-speciated testing on the stack emissions that are saturated with water vapour (i.e. where wet scrubbers are used, such as the MHF and Kiln stacks).

Also, additional PM_{10} and $PM_{2.5}$ emission testing has been undertaken for the Steel Plant Baghouse and $PM_{2.5}$ emissions testing has been undertaken for the two Melter baghouses.

6.1.2 Ambient air monitoring

As fugitive emissions are not easily quantifiable, ambient monitoring is considered to be more representative of the impact of fugitive emissions. As discussed at Section 4.5.2, NZ Steel undertakes ambient air quality monitoring at a number of locations and for a range of key contaminants associated with discharges from the Steel Mill. The AQA (**Appendix F**) included review of more than two years of required monitoring data as well as additional monitoring that was undertaken to provide a more complete understanding of the effects of Site discharges.

[36] Specifically Condition 23.

6.1.3 Dispersion modelling

While the Site ambient and stack emission monitoring data are the most reliable quantitative method for assessing Steel Mill emissions, it is also important to understanding the spatial distribution of air emissions. As such, a dispersion modelling study of the main stack emission sources at the Site has been carried out and is attached to the AQA (**Appendix F**).

The dispersion model is based on three years of meteorological data (2015 to 2017) and has been undertaken using the most recent version of the CALPUFF air dispersion model[37]. CALPUFF is an advanced dispersion model that is widely used in New Zealand, especially in areas of complex terrain and coastal situations. The model is conservative as it assumes that all stacks simultaneously emit at a constant rate throughout the year, which is likely not the case for the Steel Mill even though its operations are generally continuous.

The objectives for the dispersion modelling study supporting this application, were to:

- Investigate whether the existing air quality monitoring locations (**Figure 4.2**) provide data that is representative of worst-case impacts at sensitive receptors and to provide a basis for inferring likely air concentrations at other (un-monitored) locations if needed;
- Understand the relative impacts of different stack emission sources to measured air quality; and
- Provide a basis for assessing the effects of contaminants where air quality monitoring data is limited, or not available (such as is the case for CO, HCl and Cl_2, VOCs and Mercury).

The dispersion modelling has been validated by comparing the model predictions with measured concentrations (particularly SO_2 and NO_x where there are no other appreciable sources in the area). This validation exercise showed that the model over-predicted measured concentrations at both the 64 Glenbrook Beach Road (Site 20) and Glenbrook School (Site 17) monitoring sites. However, the modelling enabled an understanding of how much the model was over-predicting, such that an 'adjustment factor' was able to be derived to calculate more realistic estimates of off-site concentrations of contaminants. This allows useful application of the model at other particular receptors to identify the most realistic estimated concentrations of contaminants modelled.

The overall performance of the dispersion model can be evaluated by comparing the ranked modelled and measured annual datasets. The modelling has shown that the 64 Glenbrook Beach Road (Site 20) ambient monitoring site is broadly representative of levels experienced at the nearest residences on Reg Bennet Road, Mission Bush Road and Glenbrook Beach Road but was over-predicting by a greater degree to the east of the Steel Mill requiring a greater adjustment factor.

A supplementary dispersion modelling study has been provided for the proposed diesel generators and is also attached to the AQA (**Appendix F**). This has assumed a worst-case scenario that all proposed generators will be operating simultaneously.

6.1.4 Metals exposure pathway assessment

Given that metals are able to affect human health by way of both ingestion and inhalation, different assessment methods have been employed for each.

6.1.4.1 Ingestion exposure

Monitoring for deposited metals has been undertaken to estimate the theoretical metal concentrations in drinking water. There are other potential ingestion pathways, such as deposition onto soils and subsequent ingestion of homegrown produce. However, ingestion of roof-collected

[37] Latest version 7.2.1.

drinking water was adopted for the assessment because it is a relatively simple pathway to conservatively assess and is particularly relevant to the local environment. NZ Steel has undertaken monitoring of deposited metals using deposition gauges at the monitoring sites located at Boundary Road (Site 18), 64 Glenbrook Beach Road (Site 20) and the NZS Northern Boundary (Site 4B). Laboratory accredited results for the period of September 2017 to December 2019 have been reviewed for this assessment.

Drinking water samples of roof collected drinking water have been collected and tested for concentrations of metals at the locations shown in **Figure 6.1**, to validate the estimates derived from the deposition monitoring. House 3 has been selected as a representative background monitoring site as it is not expected to show any influence of the Steel Mill activities, due to the distance and angle of the dominant wind direction from the Operational Area.

The metal concentrations in drinking water samples have been compared with drinking water standards and guidelines (described in Section 6.2.2 below) to assess the health risk posed to residents in the area using roof-collected drinking water.

Figure 6.1: Locations of drinking water sample collection (yellow) in relation to the Site (red)

6.1.4.2 Inhalation exposure

TSP filters were installed at the NZS Northern Boundary (Site 4B) monitoring site to capture airborne particulate on a filter from which metal concentrations can be derived. Tests were carried out to derive an uncorrected concentration (total reported mass of each metal on the field filter) and a blank-adjusted concentration (which removes the contribution of the filter media itself).

Both the uncorrected metal concentration and the blank-adjusted concentration were compared with the assessment criteria for suspended metals.

6.1.5 Summary of assessment methods by contaminant

NZ Steel has a comprehensive ambient monitoring programme for the evaluation on the impacts of identified key contaminants off-site. Wherever possible this data has been used to evaluate the measured impact of the Steel Mill. The 64 Glenbrook Beach Road (Site 20) monitoring site is considered representative of the most affected residences to the northeast of the Site downwind of the predominant wind direction. This has been validated when considering the dispersion of contaminants from stack sources and is also considered accurate for contaminants with fugitive sources (specifically PM_{10}). For select contaminants that have not been the subject of monitoring, the dispersion model has been used to predict contaminant concentrations at identified locations.

Table 6.1 indicates, for each identified contaminant, what type of monitoring data is available, which assessment method(s) have been used to assess the contaminant and what type of adverse effect each contaminant is attributed to.

Table 6.1: Summary of assessment approach by contaminant

Contaminant	Available data		Assessment method	Effect type		
	Ambient monitoring	Stack emission data		Health	Ecology	Nuisance
TSP	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria. FIDOL assessment for assessment of nuisance dust.	-	-	✓
PM_{10}	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria.	✓	-	-
$PM_{2.5}$	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria.	✓	-	-
SO_2	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria.	✓	✓	-
NO_2	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria.	✓	✓	-

Contaminant	Available data		Assessment method	Effect type		
	Ambient monitoring	Stack emission data		Health	Ecology	Nuisance
NO_x	✓	✓	Evaluation of continuous ambient monitoring data in comparison with assessment criteria.	✓	✓	-
HCl	-	✓	Worst case stack emissions modelled and compared with assessment criteria for human health.	✓	-	-
CL_2	-	✓	Worst case stack emissions modelled and compared with assessment criteria for human health.	✓	-	-
CO	-	✓	Worst case stack emissions modelled and compared with assessment criteria for human health.	✓	-	-
VOC		✓	Worst case stack emissions modelled and compared with assessment criteria for human health.	✓	-	-
PAH/dioxins	✓	-	Evaluation of ambient monitoring data in comparison with assessment criteria.	✓	-	-
Black Carbon	✓	-	Evaluation of ambient monitoring data in comparison with assessment criteria.	✓	-	-
Metals	✓	-	Evaluation of ambient monitoring data in comparison with assessment criteria, with the exception of mercury. Modelling used for mercury, assuming all mercury in the raw materials is emitted to air via the MHF stacks.	✓	✓	-
Mercury	-	✓	The ambient monitoring methods used for evaluation of other metals were not suitable for mercury. Worst case stack emissions modelled and compared with assessment criteria for human health.	✓	-	-

6.2 Assessment criteria

Assessment criteria are published for a range of airborne contaminants, for a range of exposure averaging periods, by regulatory agencies in New Zealand and overseas. The results from the assessment methods set out above are compared with the relevant assessment criteria to assess the predicted health or environmental effects.

6.2.1 Health based assessment criteria

The assessment criteria used to evaluate ambient air concentrations are based on the hierarchy set out in GPG Industry[38], as follows:

- Ambient air quality standards set in the NESAQ. It is noted that amendments to the NESAQ have been proposed and are described further in Section 9.3.1.1. Consultation on these amendments closed 31 July 2020 and a summary of the submissions is yet to be published at the time of writing;
- The National Ambient Air Quality Guidelines (AAQG)39;
- Regional targets such as Auckland Ambient Air Quality Targets (AAAQT) are set within the AUP (unless more stringent than above criteria);
- World Health Organisation (WHO 2006) air quality guidelines40;
- California reference exposure levels (acute and chronic) and US Environmental Protection Agency (US EPA) inhalation reference concentrations and unit risk factors (chronic) – Acute and chronic reference exposure levels from California Office of Environmental Health Hazard Assessment (CA OEHHA)41 have been used;
- Texas effects screening levels (if these have been derived from toxicological data in a transparent manner) from Texas Commission on Environment Quality (TCEQ)[42].

Based on these sources, the relevant ambient air quality assessment criteria for the contaminants considered in the assessment are set out in **Table 6.2**[43], along with the corresponding averaging period and the source for each criteria. In relation to this assessment, the 1-hour and 8-hour average criteria are considered to apply anywhere beyond the boundary of the Site, while the 24-hour and annual average criteria are considered to apply at sensitive receptors.

Ambient Air Quality Targets are set within Chapter E14 the AUP for a wider range of air pollutants and at differing exposure periods. These targets align with AAQG and the guidelines set by Ministry for the Environment and the WHO for the minimisation of health risks. Where they are not expected to be relevant they have not been included (i.e. ozone, 1, 3-Butadiene, Formaldehyde, Acetaldehyde and Arsine).

Table 6.2: Summary of health-based assessment criteria

Contaminant	Concentration (µg/m³)				Reference source
	1-hour average	8-hour average	24-hour average	Annual average	
PM_{10}	-	-	50	20	NESAQ, AAQG, AAAQT
$PM_{2.5}$	-	-	25	10	WHO, AAAQT, NESAQ Consultation draft
SO_2	570/350	-	120	-	NESAQ, AAQG[44], AAAQT

[38] Ministry for the Environment. (2016). Good Practice Guide for Assessing Discharges to Air from Industry.
[39] Ministry for the Environment. (2002). Ambient Air Quality Guidelines.
[40] https://apps.who.int/iris/bitstream/handle/10665/69477/WHO_SDE_PHE_OEH_06.02_eng.pdf?sequence=1&isAllowed=y
[41] https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
[42] https://www.tceq.texas.gov/toxicology/database/tox
[43] This table combines those criteria set out in Appendix B of the AQA.
[44] The WHO 2006 guidelines include 10-minute and 24-hour average SO_2 concentrations. The 24-hour guideline was set at a concentration of 20 µg/m³, which is substantially lower than the New Zealand AAQG of 120 µg/m³ (which was the

Contaminant	Concentration (µg/m³)				Reference source
	1-hour average	8-hour average	24-hour average	Annual average	
NO_2	200	-	100	40	NESAQ, AAQG, WHO, AAAQT
CO	30,000	10,000	-	-	NESAQ, AAAQT
HCl	2,100	-	-	-	OEHHA
Cl_2	210	-	-	-	OEHHA
Benzo[a]pyrene	-	-	-	0.0003	AAQG, AAAQT
Dioxins (TEQ)	-	-	-	0.00004	OEHHA
Mercury	-	-	-	0.33	AAQG, AAAQT (0.33 µg/m³ inorganic, 0.13 µg/m³ organic)
Lead	-	-	-	0.2	AAQG, AAAQT (three month rolling average)
Cadmium	-	-	-	0.3	WHO
Arsenic	-	-	-	0.0055	AAQG, AAAQT
Chromium	-	-	-	0.11	AAQG, AAAQT (Chromium metal and chromium III)
				0.0011	AAQG, AAAQT (Chromium VI)
Copper	100	-	-	-	OEHHA
Nickel	0.2	0.06		0.014 0.0025	OEHHA WHO
Manganese				0.15	WHO
Vanadium			1	-	WHO
Zinc	-	-	-	2	TCEQ ESL
VOCs[45] as follows:					
Benzene	-	-	-	3.6	AAQG
Toluene	5,000			420	CA OEHHA
Ethylbenzene	2,000			-	CA OEHHA
Total xylenes	22,000			700	CA OEHHA (technical mixture of m,o,p-xylenes)
Styrene	21,000			900	CA OEHHA
Iso-propylbenzene (cumene)	250			-	TCEQ ESL
n-Propylbenzene	2500			-	TCEQ ESL
1,3-5-Trimethlybenzene	4400			-	TCEQ ESL (surrogated to trimethylbenzene)

previous WHO guideline value). This matter has been extensively investigated in the regional planning process for Auckland Council in relation to the AUP, which subsequently did not seek to adopt the WHO 24-hour average SO_2 guideline.

[45] Refer Table 4.2 in AQA (**Appendix F**)

Contaminant	Concentration (µg/m³)				Reference source
	1-hour average	8-hour average	24-hour average	Annual average	
1,2,4-Trimethylbenzene	4400			-	TCEQ ESL (surrogated to trimethylbenzene)
Sec-Butylbenzene	2740			-	TCEQ ESL (surrogated to butylbenzene)
Napthalene	9			-	CA OEHHA
Methyl isobutyl ketone (MIBK)	820			-	TCEQ ESL
2-Chlorotoluene					TCEQ ESL (surrogated to chlorotoluene)
n-Butylbenzene					TCEQ ESL (surrogated to butylbenzene)

NESAQ = National Environmental Standards for Air Quality; AAQGL = Ambient Air Quality Guidelines; WHO = World Health Organisation; CA OEHHA = Californian Office of Environmental Health Hazard Assessment; TCEQ ESL = Texas Commission on Environmental Quality – Effects Screening Levels.

6.2.2 Assessment criteria for drinking water

Minimum standards for the quality of drinking water in New Zealand to protect public health are set out in the Drinking Water Standards for New Zealand 2005 (revised 2018) (DWSNZ). Maximum Allowable Values (MAVs) are specified for concentrations of metal contaminants (in milligrams per litre) that are considered to *constitute no significant risk to the health of a person who consumes 2 litres of that water a day over their lifetime (usually taken as 70 years*)[46]. Derived MAVs for aluminium, cobalt, iron, vanadium and zinc are provided in Appendix D of the AQA (**Appendix F**).

MAVs have not been specified for all metals monitored at locations around the Site. In these cases, the drinking water standards published by the WHO[47] and California OEHHA have been referred to. Some of the monitored metals have no known health effects and may be dietary essentials or conventional components of drinking water. In these cases, no MAV or provisional MAV can be listed.

The MAVs and source of the value for all deposited metals monitored by NZ Steel are shown in **Table 6.3**. Where a MAV has not been provided by DWSNZ or WHO, a derived value has been used (as set out in AQA (**Appendix F**)).

Table 6.3: Maximum allowable value in drinking water

Metal deposit	Guideline basis	MAV (µg/L)	Source
Aluminium	Health based guideline	1000	Derived MAV
Arsenic	Health based guideline	10	DWSNZ
Beryllium	Health based guideline	400	DWSNZ (previous edition)
Boron	Health based guideline	1400	DWSNZ

[46] Section 1.6.4 Drinking-Water Standards for New Zealand
https://www.health.govt.nz/system/files/documents/publications/dwg-ch1-introduction-jun19.pdf
[47] WHO. 2017. "Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum"

Metal deposit	Guideline basis	MAV (µg/L)	Source
Cadmium	Health based guideline	4	DWSNZ
Chromium	Health based guideline	50	DWSNZ (provisional)
Cobalt	Health based guideline	70	Derived MAV
Copper	Health based guideline	2000	DWSNZ
Iron	Health based guideline	2000	Derived MAV
Lead	Health based guideline	10	DWSNZ
Magnesium	No health-based guideline	-	No provisional guideline
Manganese	Health based guideline	400	DWSNZ
Mercury	Health based guideline	7	DWSNZ
Nickel	Health based guideline	80	DWSNZ
Titanium	No health based-guideline	-	No provisional guideline
Vanadium	Health based guideline	15	OEHHA Notification Level
Zinc	Health based guideline	7000	Derived MAV

6.2.3 Ecological assessment criteria

The AAQG include criteria for ecological effects, divided into critical levels for ambient concentrations of acid gases on plants, and critical loads for assessment of deposition of air pollutants into ecosystems. These criteria are based on the UNECE/WHO (1996)[48] and Australia and New Zealand Environment and Conservation Council (ANZECC[49]) guideline values.

Table 6.4: Ambient air quality standards and guidelines for ecological effects

Substance	Averaging period	Value (µg/m^3)	Source of standard/guideline
SO_2	Annual and winter average	30	UNECE/WHO (Agricultural crops)
		20	UNECE/WHO (Forest and natural vegetation)
	Annual average	10	UNECE/WHO (Lichen)
NO_X	Annual average	30	WHO/UNECE/ANZECC
Nitrogen deposition	Annual quantity	5 kg/hectare	UNECE/WHO
Sulphate deposition	Annual quantity	No criteria	-

[48] United Nation Economic Commission for Europe. Convention on the Long Range Transboundary Air Pollution. 1996 World Health Organisation. Proposed Air Quality Guidelines for Europe. 1996.
[49] https://www.waterquality.gov.au/anz-guidelines

7 Assessment of effects on the environment

7.1 Overview

7.1.1 Scope of assessment

Schedule 4 and section 104 of the RMA require assessment of effects on the environment of allowing an activity. The "environment" upon which effects must be assessed is discussed at Section 2.3 of this AEE.

In accordance with section 104(1)(a) of the RMA, the assessment set out in the following sections identifies and assesses the types of effects that may arise from the proposed activities provided for under this application. This assessment also outlines the measures that NZ Steel proposes to avoid, remedy or mitigate any potential adverse effects on the environment.

The activity of discharging contaminants to air from drying and kiln processes is required as a restricted discretionary activity. The applicable Matters of Discretion are contained at E14.8.1(1) and (5) and the associated Assessment Criteria are contained at E14.8.2. These have been considered below along with a broader assessment of effects in recognition of the overall discretionary status of the application.

This assessment draws on information provided in the technical reports contained within **Appendix F to Appendix I** and addresses the following effects:

- Positive effects;
- Nuisance effects;
- Health effects;
- Odour effects;
- Ecological effects;
- Landscape, visual amenity and natural character effects;
- Cultural effects; and
- Cumulative effects.

7.2 Positive effects

The NZ Steel business is a producer of flat, rolled steel and long products for the building, construction, manufacturing and agricultural businesses. The Steel Mill is the only domestic producer of steel products from predominantly locally sourced raw materials – Primary Concentrate (ironsand), coal and limestone – in accordance with New Zealand's strict environmental, employment, safety and quality standards. NZ Steel is a significant contributor to the national and regional economy. Business and Economic Research Limited (BERL) has produced an Economic Impact Statement (**Appendix H**) which provides an independent summary of the economic contribution of NZ Steel's operations, including the Steel Mill. Including the economic impacts, a number of positive effects arise from the operation of the Steel Mill. These positive effects include:

- In 2019/20 the GDP impact of NZ Steel's operations on New Zealand's economy was approximately $600 million. This included approximately $273 million of direct impact, $107 million indirect impact and $216 million of induced impact. To put the direct contribution of NZ Steel to Auckland's GDP into context, the direct impact of NZ Steel in Auckland is comparable to commission-based wholesaling industry which had a direct GDP contribution of $250 million in 2020 and the accommodation industry which directly contributed $307 million to Auckland's GDP;

- NZ Steel directly employs around 1,250 people. Nationally, the employment impacts of NZ Steel supports a total of 4,063 full time equivalent employees. businesses and suppliers by utilising their goods and services;
- NZ Steel's total expenditure, including indirect and induced impacts, contributed approximately $1.62 billion to the NZ economy in the 2019/20 financial year;
- For every tonne of steel produced in New Zealand, 80% of the dollars spent on that steel stays within New Zealand, compared to only 5% of the dollars spent on imported steel[50];
- Eighty percent of co-products are recycled, re-used or sold, 60% of electricity at the Site is produced from recycled gas (at the Co-generation Plants) and 98% of wastewater is recycled47. All of these activities make better use of resources and by-products;
- NZ Steel also sponsors several community programmes relating to environmental awareness such as the Tread Lightly Caravan, Trees for Survival and Te Whangai Trust; and
- The Steel Mill has existed on the Site since 1968. The ongoing use of the existing infrastructure provides for efficient use of resources and infrastructure. Significant capital investment has been required to set up the infrastructure and asset base that exists at the Site today.

The Steel Mill contributes significantly to the wellbeing of those directly employed and the wider economy and its ongoing use of existing infrastructure represents an efficient use of resources.

7.3 Nuisance effects – TSP and PM_{10}

Particulate larger than 10 microns are referred to as Total Suspended Particulate (TSP) and those smaller are referred to as PM_{10}. Both contribute to nuisance effects due to their deposition in the environment, primarily due to soiling of clothes or building surfaces.

Monitoring data collected at the Training Centre (Site 3) monitoring site[51] is considered the most relevant for evaluating the impact of TSP on ambient dust levels as it is located relatively close to the northern yard area and will experience much higher dust levels than off-site receptors.

Higher mean TSP concentrations are observed on weekdays, and reduced levels occur during the winter months (when it is wetter) and weekends (when there is less activity on the Site). These patterns indicate that fugitive emissions from activities at the Steel Mill are the key source of the nuisance dust impacts off-site, downwind of the Site.

Activities that are likely to be contributing to TSP emissions are described at Section 3.3 and include tipping of hot materials, handling, crushing and screening of materials, movement of vehicles and manufacturing process fugitive emissions. Properties to the northeast of the northern yard are downwind of the predominant wind direction and therefore most likely to experience impact from fugitive emissions.

The key to assessing nuisance dust effects is whether the dust is offensive or objectionable. Whether dust has an offensive or objectionable effect requires an overall judgement that considers the "FIDOL[52]" factors. The AQA (**Appendix F**) provides a FIDOL assessment that takes into account the measures that NZ Steel employs to avoid, remedy and mitigate effects from nuisance dust including:

- Separation from sensitive receptors. The distance from the source at which deposition of TSP will continue to occur will vary depending on the scale and nature of the dust emissions and

[50] NZ Steel Sustainability snapshot, July 2020. https://www.nzsteel.co.nz/assets/Uploads/Files/NZPI-SustainabilityDocument-Jul20-web3.pdf

[51] Which is on-site, directly downwind of the prevailing south-westerly winds.

[52] Frequency, Intensity, Duration, Offensiveness/character, Location Assessment as described in MFE "Good Practice Guide for Assessing and Managing Odour" (MfE, 2016a)

on the wind strength. Generally speaking, the potential for dust nuisance effects will decrease with increasing separation distances from the source and decrease with damper conditions;

- Short term trigger levels. NZ Steel's existing Main Air Permit requires monitoring of the main stack emission sources and ambient concentrations of TSP as described in Section 4. The Main Air Permit also sets an investigative trigger level for when particulate concentrations reach levels that may cause adverse effects beyond the boundary of the Site. When the trigger criteria are exceeded, NZ Steel is notified (by text) and initiates an investigation into the conditions and likely causes of the exceedance in order to take actions to prevent further exceedances as appropriate; and
- Minimisation at the source. Methods for minimising fugitive emissions at the source is set out in the AQMP (**Appendix F**) and include (but are not limited to) limiting vehicle speeds, ensuring sealed roads are well maintained, stabilising unsealed roads, housekeeping and using water carts and road sweepers.

NZ Steel's community complaints register indicates that the major contributor to dust complaints is deposition of RPCC particles (from RPCC tipping), which has a distinct localised pattern and is the cause of 43 of the 56 complaints on record. The complaints register also shows a decreasing trend in complaints since 2016, indicating that effectiveness of operational improvements in the Primary Plants which has resulted in less RPCC tipped. NZ Steel has a long-established objective to minimise loss of RPCC for a range of reasons, including material and production efficiencies (cost and yield), to avoid particulate deposition in the community (nuisance effect) and to avoid waste creation.

The AQA (**Appendix F**) assessment indicates that with the reasonably large separation distance to receptors and the ongoing monitoring and management of dust (including the additional mitigation proposed in Section 4), it is unlikely that frequency, intensity and duration of any dust experienced at sensitive locations will cause adverse nuisance effects that are offensive or objectionable. As such, nuisance effects of dust have been assessed to be less than minor.

7.4 Health effects

Air discharges have the potential to have adverse effects on health through inhalation. The AQA in **Appendix F** is accompanied by an independent assessment of effects on public health, prepared by Dr Francesca Kelly of Environmental Medicine Limited.

7.4.1 Particulate – PM_{10} and $PM_{2.5}$

The major emission from the Steel Mill is particulate (dust). The effects of particulate are related to particle size. Particulate larger than PM_{10} are generally referred to as TSP (see above), which is used as an indicator of nuisance dust, as it includes the larger, non-respirable fraction of particulate matter (this is discussed at Section 7.3).

The particular interest with respect to potential for health effects, are particulates smaller than ten microns in aerodynamic diameter (PM_{10}) and the sub-set less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$). PM_{10} is considered to be inhalable, with smaller fractions being respirable and therefore able to enter the respiratory system exacerbating existing health conditions[53]. Epidemiological studies have provided no evidence for the existence of a threshold value below which no adverse health effects are observed for either PM_{10} or $PM_{2.5}$. New Zealand Standards and WHO Guidelines (described in Section 6) provide ambient air quality standards or guidelines for PM_{10} and $PM_{2.5}$ for both 24-hour and annual averaging periods.

[53] Particulate greater than 10 µm in size is generally considered to be non-inhalable, as they do not penetrate further than the mouth and nose.

Sources of PM_{10} and $PM_{2.5}$ from the Site are from stack emissions, combustion processes and fugitive emission sources. Section 7.4.1.1 discusses PM_{10} and Section 7.4.1.2 discusses the smaller fraction of $PM_{2.5}$. The assessment is considered to contain a level of conservatism given the assessment is based on effects as if they occur at the nearest sensitive receptor[54], therefore any existing or potential future sensitive receptor will experience lesser effects than those described below.

7.4.1.1 PM_{10}

The AQA (**Appendix F**) demonstrates that the concentration of PM_{10} at the 64 Glenbrook Beach Road (Site 20) monitoring site is generally acceptable. However, there is an increasing trend over the years such that the PM_{10} concentrations experienced are nearing or sometimes exceeding the assessment criteria. In summary, recent monitoring data records show:

- In 2019 the annual average concentration at 64 Glenbrook Beach Road (Site 20) was 19.3 mg/m^3 which is nearing the AAQG annual average assessment criterion of 20 µg/m^3. There is a trend of increasing PM_{10} concentrations at this site and given there has not been any corresponding increase in particulate stack emissions, this increase is considered likely to be due to increasing fugitive emissions from the northern part of the Operational Area.
- For eight of the last 13 years there have been occasions where PM_{10} values at the 64 Glenbrook Beach Road (Site 20) have been greater than the NESAQ PM_{10} value (being 24-hour average PM_{10} concentration limit of 50µg/m^3). As these measurements have occurred on an industrial premise that has resource consents for emissions of PM_{10}, they do not constitute a breach of the NESAQ[55] (this is discussed further in Section 9.3.1). Exceedances of the NESAQ value were recorded at the Glenbrook School (Site 17) monitoring site in 2009 and 2019. However, evaluation of weather conditions and pattern of concentrations suggest that this was likely due to a localised source (for example rural burning or similar) and was not related to activities at the Steel Mill given the wind direction.

The polar plots (**Figure 7.1**) below, indicate the influence of the Steel Mill on PM_{10} readings at the 64 Glenbrook Beach Road (Site 20) and Glenbrook School (Site 17) monitoring locations. The pattern observed at the Sandspit Reserve (Site 19) shows the influence of marine aerosols and potentially also domestic heating on ambient PM_{10} levels. The 64 Glenbrook Beach Road monitoring site (Site 20) is the closest monitoring location to the Operational Area, being located near the boundary of the Site at a location representative of the worst affected off-site sensitive receptors.

[54] Which in many cases is derived from the results obtained from the 64 Glenbrook Beach Road (Site 20) monitoring site
[55] See NESAQ, Regulation 14(2).

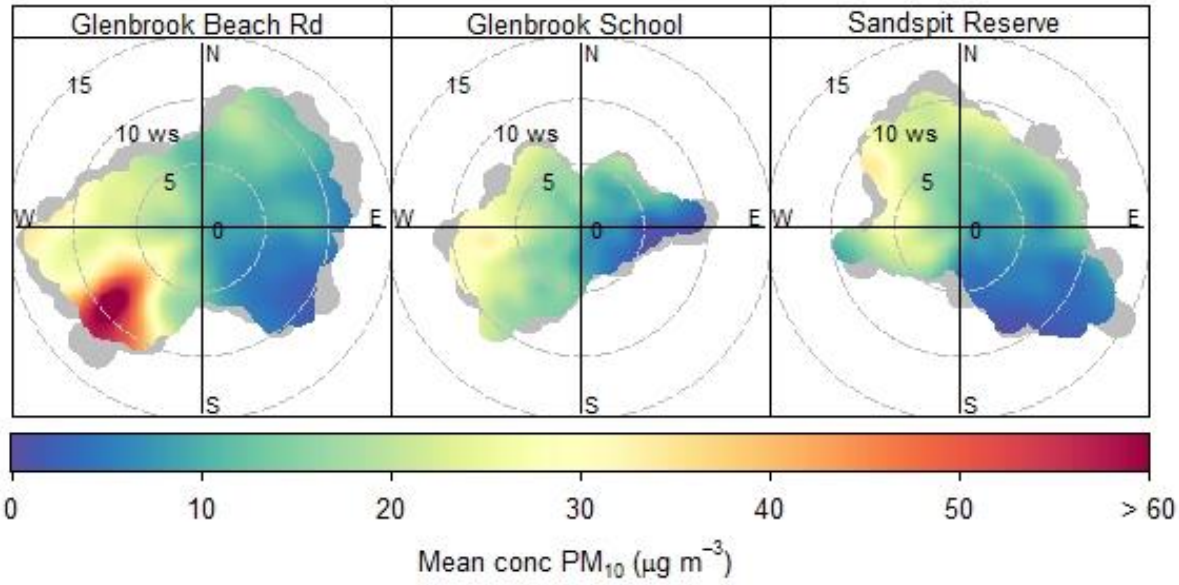


Figure 7.1: Polar plots of hourly PM_{10} concentrations at Glenbrook Beach Road, Glenbrook School, Sandspit Reserve monitoring sites

Analysis of the monitoring data was undertaken to determine whether there were temporal patterns within the data. The analysis indicated a wind speed-dependent relationship. Other trends show lower levels in the winter months and on the weekends, compared to weekdays. The pattern on Saturday and Sunday shows that while a relationship with wind speed is observed on the weekends, the mean concentration is lower. This suggests the influence of weekday activities at the Steel Mill (such as raw material deliveries, movement of material to the landfill, operation of the Metal Recovery Plant and Aggregate Plant) are contributing to off-site PM_{10} concentrations.

Based on the above, further qualitative analysis has been undertaken to understand which activities undertaken within the Operational Area contribute the greatest to fugitive PM_{10} discharges. The main sources of fugitive emissions with the potential to materially contribute to off-site PM_{10} concentrations are considered to be:

- Vehicle movements on site roadways, particularly unsealed roads;
- Handling and processing of co-products, wastes and raw materials; and
- Fugitive emissions from manufacturing processing and associated activities.

The contribution to off-site PM_{10} levels from all other activities is expected to be low.

As indicated in Section 4, additional mitigation measures have recently been implemented, and further measures are proposed to be implemented, to mitigate the effects of fugitive emissions. These will aid in reducing the dust from the Site, thereby reducing the levels of PM_{10} experienced beyond the boundary of the Site.

An independent public health expert assessment[56] has been undertaken in relation to the impact of the occasions where PM_{10} levels have been greater than the NESAQ PM_{10} value at the 64 Glenbrook Beach Road (Site 20) monitoring site, given this is considered representative of off-site impacts. This assessment concludes that on the infrequent sporadic days where the 24-hour average PM_{10}

[56] Attached to the AQA at **Appendix F**.

concentration value of 50µg/m^3 is exceeded, the health effects are minor, and the overall level of health effect of PM_{10} is less than minor.

It is also noted that the additional impact of the generator emissions would not materially alter the off-site PM_{10} (or $PM_{2.5}$) concentrations under these worst-case conditions. Under the conditions that result in peak existing measured PM_{10} concentrations, the incremental contribution from the operation of all 19 proposed generators is estimated at 0.1 ug/m^3 (24 hour average).

In summary, PM_{10} emissions are generally acceptable based on the monitoring data from 64 Glenbrook Beach Road (Site 20) and with the implementation of the improvements set out in Section 4, the actual and potential health effects of PM_{10} on human health will be no more than minor.

7.4.1.2 $PM_{2.5}$, secondary particulate and black carbon

Particulate smaller than ten microns in aerodynamic diameter can have an adverse effect on human health where exposure is high, as particles of this size can penetrate further into the respiratory tract.

Ambient monitoring for $PM_{2.5}$ has been carried out at the 64 Glenbrook Beach Road (Site 20) since March 2018. The resulting polar plots suggest a more precise source than the pattern shown for PM_{10}. As such, this is suggestive of point source emissions being the main contributing source as opposed to fugitive emissions. A recent study for the Lyttelton Port Company (LPC) on elemental composition of particulate discharges from its coal stockyard using ion beam analysis found that 90% of the PM_{10} attributable to coal was present in the coarser fraction ($PM_{2.5}$ – PM_{10}) with only approximately 10% sub-$PM_{2.5}$. This further supports a conclusion that fugitive sources, particularly coal, have a minor contribution to $PM_{2.5}$ levels off site. As a result, the AQA has conservatively assumed that all PM_{10} from the main point source emissions (being the KOBM flarestack, MHFs and Kiln stacks) is present as $PM_{2.5}$.

At the 64 Glenbrook Beach Road monitoring site (Site 20) there have been no exceedances of the 24-hour average or annual average proposed ambient air quality standards over the monitoring period[57]. Given its proximity to the Operational Area, acceptable performance can be inferred to mean equivalent or lower concentrations of $PM_{2.5}$ at other sensitive locations such as Glenbrook School (Site 17).

Secondary $PM_{2.5}$ can also form through the emission of NO_x and SO_2 from the stacks. The secondary particulate from the point source emissions to the wider airshed will represent only a very small contribution to these already low levels.

Black carbon is a component of $PM_{2.5}$ and is an indicator of the contribution of combustion sources. Partisol filter samples have been collected at the NZS Northern Boundary (Site 4B) monitoring site. Analysis shows that the annual average concentration is 0.51 µg/m^3 and the maximum 24-hour average concentration is 1.3 µg/m^3. However, there are no assessment criteria for evaluation of health effects. In comparison with the black carbon levels measured at urban sites in Auckland (in 2005 and 2016), the levels measured at the NZS Northern Boundary (Site 4B) monitoring site are significantly lower.

Based on the above, the actual and potential health effects of $PM_{2.5}$, secondary particulate and black carbon on human health will be less than minor.

[57] **Table 6.2** sets out the applicable standards and source of the standards.

7.4.2 Sulphur oxides

Sulphur oxides (SO_2 and SO_3) pose a risk to human health because if inhaled, it can be a potent respiratory irritant. SO_2 acts directly on the upper airways (nose, throat, trachea and major bronchi), producing rapid responses within minutes.

SO_2 is produced from the combustion of materials containing coal and therefore are produced in the processes undertaken at the Iron Plant, mainly the MHFs. SO_2 emissions are a function of the sulphur content of the coal therefore, unlike particulate matter, the Steel Mill is the only significant contributor of sulphur oxides in the environment. SO_3 emissions are likely to be minimal.

Ambient air monitoring for SO_2 was carried out at the 64 Glenbrook Beach Road (Site 20) (March 2017 to June 2020) and Glenbrook School (Site 17) (June 2018 to June 2020). The data shows that there were no exceedances of the NESAQ or NZ AAQG values over the monitoring period at the two monitored sites. However, there were occasional exceedances (in the order of one to four days per year) of the 24-hour average WHO guideline value at the 64 Glenbrook Beach Road (Site 20) site. Further analysis of these exceedances showed that the elevated concentrations are likely related to meteorological conditions influencing the dispersion of MHF stack emissions. Monitoring results for Glenbrook School (Site 17) were below the NESAQ, NZ AAQG and the WHO guidelines. The dispersion modelling showed that the levels of SO_2 at 64 Glenbrook Beach Road (Site 20) correspond to the most affected residences northeast of the Site. The intermittent operation of the proposed generators is not expected to materially influence these contaminant levels (largely due to differences in stack heights and the associated dispersion patterns).

An independent public health expert assessment[58] has been undertaken in relation to the impact of the occasions where SO_2 levels have been greater than the WHO guideline at the 64 Glenbrook Beach Road monitoring site (Site 20). This assessment concludes that the overall pattern and distribution of the data supports a conclusion that the SO_2 exposure is consistent with minimal health effects.

Therefore, the ambient monitoring data suggests that the current consent condition relating to sulphur content of coal at 0.5% is appropriate as SO_2 air quality at sensitive receptors is generally acceptable. Therefore, the actual and potential health effects of sulphur oxides is considered to be less than minor.

7.4.3 Nitrogen oxides

Nitrogen oxides (NO_X) is a collective term used to refer to nitrogen monoxide (nitric oxide or NO) and nitrogen dioxide (NO_2). Exposure to nitrogen oxides has the potential to cause effects on lung function, airway responsiveness and increase reactivity to allergens, particularly in children. Nitrogen oxides have also been shown to increase the effects of exposure to other known irritants, such as ozone and other respirable irritants.

The main sources of nitrogen oxide emissions are associated with the combustion of waste gases in the Iron Plant (including MHFs, kilns and cogeneration plant). Other sources include natural gas combustion processes (such as the slab reheat furnace).

NZ Steel commissioned ambient air monitoring equipment for NO_X at the 64 Glenbrook Beach Road (Site 20) (November 2018 to August 2020). This monitoring shows that there have been no exceedances of the assessment criteria over the monitoring period. The maximum recorded 1-hour and 24-hour average concentrations are both less than 30% of the relevant assessment criterion. The intermittent operation of the proposed generators is not expected to materially influence these

[58] Attached to the AQA at **Appendix F**.

contaminant levels (largely due to differences in stack heights and the associated dispersion patterns).

While the monitoring data shows that the Steel Mill is clearly an influence on NO_2 levels beyond the boundary of the Site, there are no measured ambient concentrations that exceed any of the relevant health-based air quality guideline values. Therefore, the actual and potential health effects from nitrogen oxides are considered to be less than minor.

7.4.4 Carbon monoxide

High exposures to carbon monoxide (CO) can cause acute poisoning, with coma and eventually collapse occurring. However, ambient exposures to CO are typically several orders of magnitude lower than those associated with acute poisoning.

CO is a component of the waste gas generated by the direct reduction processes at the MHFs, Kilns, Melters and during de-carburisation in the KOBM. CO gas is highly flammable, so the waste gases from the iron and steelmaking processes are directed to either afterburners for energy capture or flared at the stack exit, which combusts the CO to carbon dioxide. The Kiln stacks are considered the most significant mass emission point source of CO at the Site. However, the monitoring shows consistent compliance with the limit set in the Main Air Permit.

There has been no monitoring of ambient concentrations of CO in the vicinity of the Site, because the impacts of the emissions from the Steel Mill are expected to be low compared to the relevant assessment criteria. This has been validated using dispersion modelling. The model used the highest measured CO emission rates (which are the same as the consented limit) from all four Kilns simultaneously and estimated emission rates from flaring at the KOBM Flarestack. The predicted cumulative (conservatively including the proposed generator operation) 1-hour average and 8-hour average ground level concentrations are well below (at most 34%) of the assessment criteria.

Therefore, the actual and potential health effects of CO emissions are assessed as being less than minor.

7.4.5 Metals

The adverse effects of ambient concentrations of metals are varied and depends on the specific metal and may include both acute and chronic exposure toxicity effects. Metal oxides can be entrained in particulate from the Steel Mill. Activities at the landfill, which are authorised under a different consent, are also a potential source of metal deposition in the area. However, there is no practical way to differentiate between metals emissions from the landfill and the Steel Mill.

Exposure to metals has been evaluated considering both an inhalation pathway through analysis of TSP filter samples from the NZS Northern Boundary (Site 4B) monitoring site and an ingestion pathway through sampling deposited metals that are in roof collected drinking water.

The screening assessment undertaken identified four metals (vanadium, cadmium, iron and manganese) that are both likely to be attributed to Steel Mill activities and screened as producing drinking water concentrations greater than 5% of the maximum allowable value (MAV) in the Drinking Water Standards for New Zealand 2005 (revised 2018)[59].

NZ Steel also conducted three rounds of drinking water sampling from properties that have roof-collection of rainwater for drinking (as described in Section 6.1.4) to validate the above screening exercise. The sampling showed:

[59] Where a MAV was not available the drinking water standards published by the WHO and California OEHHA have been referred to.

- No exceedances of the Drinking Water Standards;
- No exceedances of the derived MAVs, with the exception of one exceedance of the criteria for lead at House 3, which as discussed below has been assessed as being unrelated to the Steel Mill.
- Confirmed that vanadium levels in roof-collected drinking water are within the derived MAV (based on a Californian based notification level), and below the OEHHA notification level at sites expected to be influenced by the Steel Mill;
- Manganese and iron were detected at low levels that do not pose a concern for human health; and
- Cadmium was rarely detected in any of the samples, with the exception of House 5 where the elevated levels were attributed to roofing materials.

The sole location where the monitoring showed one exceedance of the criteria for lead was at House 3. House 3 is 8.7 km from the Steel Mill, located in Patumahoe, and was selected as a background site. The lead exceedance has been assessed as being due to low rainfall and lead nails on an old section of the roof and is unrelated to the Steel Mill.

Based on the deposition monitoring and validation from the drinking water samples, deposition of metals onto rooftops used for collecting drinking water is not expected to pose a risk to human health at the properties neighbouring the Steel Mill.

Using the deposited metal assessment method for potential inhalation effects, the following conclusions are made:

- The effective concentration of nickel and chromium in the field is negligible; and
- For all other metals considered, both the uncorrected and blank-adjusted concentrations are well below the relevant assessment criteria.

Two of the metals present at measurable concentrations in the TSP filters are known to be carcinogenic: arsenic and cadmium. The AQA has therefore assessed cumulative exposure using guidance on acceptable risk levels for carcinogenic effects[60]. The assessment demonstrated that the cumulative incremental lifetime cancer risk is well within (an order of magnitude below) levels that would be of potential concern.

The generators, as discussed at Section 3.3.4, which are not currently contributing to emissions but are proposed to, are likely to produce some low levels of metal particulate, however, this is not expected to be significant in the context of the Steel Mill activities.

Based on the assessment undertaken, it is considered that the actual and potential effect on human health from metals (either through inhalation or ingestion) is less than minor.

7.4.5.1 Mercury

Mercury is more volatile than other metals and is more difficult to measure because it tends to re-volatilise while it is being sampled, or while samples are being stored and transported. Therefore, it is unlikely that this would be detected in deposited metal testing. For this reason, the potential for effects from exposure to mercury have been assessed based on dispersion modelling.

The model conservatively assumes all mercury is discharged to the atmosphere (as opposed to having a proportion contained within the air pollution equipment). Regardless, the modelled ground level concentration is 0.05% of the relevant assessment criterion. Therefore, the effects of mercury on actual and potential health effects are assessed as being negligible.

[60] Ministry for the Environment (2011) Toxicological Intake Values for Priority Contaminants in Soil. p4

7.4.6 PAHs and dioxins

PAHs are compounds naturally occurring in coal (and crude oil and gasoline). They are primarily released as products of incomplete combustion, in the presence of chlorine, and are therefore most likely to be produced in the Iron Plant where coal is initially processed. Therefore, the Steel Mill is also expected to be the main source of PAHs in the area. While there may be other small sources of PAHs locally such as local burning of rubbish and transport emissions, these are expected to be minor. Long term exposure to PAHs is considered carcinogenic and can cause cataracts, kidney and liver damage, and jaundice.

The term "dioxins" is used to collectively describe a group of compounds with a similar chemical structure. These compounds belong to three closely related families; the polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and certain polychlorinated biphenyls (dioxin-like PCBs) of which only 17 of 210 have significant toxicity. Dioxins are generally produced unintentionally as a by-product of some industrial processes and combustion processes.

Four months of ambient PAHs and dioxin monitoring data has been collected and assessed[61]. This ambient monitoring data indicates that concentrations of dioxins are well below the assessment criteria. Modelling of emissions of PAHs from the operation of the generators shows a negligible impact on off-site concentrations, with an additional contribution of 0.03% of the Benzo[a]pyrene annual average criterion.

Therefore, the effect of dioxins and PAHs on human health beyond the boundary of the Site is considered less than minor.

7.4.7 Hydrogen chloride and chlorine

Hydrogen chloride is an acidic gas and acts as an irritant in the respiratory tract. Chlorine gas is moderately water soluble, and it can form hypochlorous acid and hydrochloric acid, as it dissolves into airway surface liquid when contacting mucosal surfaces and airways, causing similar irritation in the respiratory tract.

HCl and Cl_2 emissions are associated with the pickling line process (in the Rolling Mills) where hydrochloric acid solution is used to clean metal oxides from steel products prior to surface finishing. The spent HCl from the Pickle Line is regenerated in the Acid Regeneration Plant (ARP) where the scrubber vent contains residual levels of HCl and Cl_2.

Monitoring has been undertaken at the ARP on a quarterly basis and the Pickle Line scrubber on an annual basis under the Main Air Permit. Spurious exceedances of the HCl consent limit at the ARP are understood to be false positives caused by droplet carry-over from the scrubber prior to their removal at the separator. However, a conservative approach has been adopted and the highest reading has been used in the dispersion modelling to evaluate effects.

The model-predicted cumulative effects of HCl and Cl_2 are extremely low relative to the assessment criteria, even when using the highly conservative dispersion model and peak measured emission rates. Therefore, the actual and potential effects of HCl and Cl_2 emissions on human health are assessed as being negligible.

7.4.8 Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOC) include a variety of aromatic hydrocarbons, some of which have short- and long-term adverse health effects. VOCs may also react with nitrogen oxides emitted

[61] While all months analysed are representative of summer conditions when ambient levels of dioxin and PAH are lowest, it is not anticipated that the winter levels will approach the assessment criteria.

mainly from vehicles and industrial activities to form ozone, which in turn helps the formation of fine particulates.

The potential effects of exposure to different VOCs are human health effects, which at low to moderate exposures can cause irritation of the nose and throat, shortness of breath, nausea and dizziness. At higher concentrations VOCs can damage the kidneys and lungs.

The Paint Line includes a separate prime and finish drying ovens associated with the application of solvent paints. The emissions to air from the drying ovens are treated through incinerators to reduce emissions of VOCs at the outlet.

Emission testing has been undertaken annually on the prime and finish incinerator stacks since 2014, for a suite of VOCs. VOC results vary depending on the paint type being applied at the time of the emission testing.

The modelled concentrations of VOCs are all less than 1% of the relevant assessment criteria and in most cases, many orders of magnitude below the criteria. Therefore, the actual and potential human health effects of VOC emissions are assessed as negligible.

7.4.9 Summary of health effects

The ongoing ambient monitoring programme shows that the ambient levels of $PM_{2.5}$, NO_X and SO_2 at the 64 Glenbrook Beach Road (Site 20) monitoring site comply with all relevant NZ standards. Analysis of the deposition of metals has also found that rooftop drinking water collected at properties in the vicinity of the Steel Mill comply with the NZ Drinking Water Standards.

While there is evidence of occasional sporadic exceedances of the WHO guideline value for 24-hour average SO_2 (around two to four days per year) at the 64 Glenbrook Beach Road (Site 20) monitoring site, the NESAQ and NZ AAQG criterion has been complied with at all times and no exceedances have been recorded at the Glenbrook School (Site 17) site. An independent public health expert assessment on these sporadic exceedances has been undertaken and based on the conclusions drawn it is considered that the actual and potential adverse effects on human health is less than minor.

The 24-hour average NESAQ value for PM_{10} is periodically exceeded within the Site, at the 64 Glenbrook Beach Road monitoring site (Site 20) monitoring site, with a peak of 12 exceedances observed in 2017. These exceedances of the value are observed to occur during the week and during dry conditions with high windspeeds from the direction of the Steel Mill and hence fugitive emissions are understood to be the primary contributor to these exceedances. NZ Steel has been undertaking a programme of improvements to reverse the trend and minimise fugitive emissions levels including sealing and re-sealing roads and exits, installing of fixed water sprays and a wheel wash, optimising stockpile heights and volumes, commissioning fume suppression for iron plating activities and acquisition of new vehicles for road sweeping and watering. The Steel Mill ambient monitoring programme is ongoing to evaluate the impact of these changes. Over time it is anticipated the monitored level of PM_{10} at Site 20 will improve and will likely already have improved as a result of measures recently implemented. The public health assessment undertaken has assessed the occasions where the NESAQ value is exceeded and concludes that the effects on human health are minor for that period but overall effects of PM_{10} are considered to be less than minor.

On this basis, actual and potential effects on human health are considered to be no more than minor.

7.5 Odour effects

Although there may be small amounts of potentially odorous compounds or processes that result in localised odour, e.g. hydrogen sulphide in the MHF stack and residual VOCs from the Paint Line incinerators, there are no significant sources of odour at the Site. Additionally, odour has never been identified as an issue around the Site or within the community as a result of Steel Mill activities. On this basis, effects from odour are considered negligible and have not been assessed any further.

7.6 Ecological effects

7.6.1 Effects of air discharges and deposition on key ecosystems

Emissions of discharges such as particulate, sulphur and nitrogen oxides relate to impacts on sensitive vegetation and may have adverse effects on terrestrial ecosystems. Effects on ecology as a result of air discharge, can occur due to both direct emissions to air and secondary effects through deposition.

As discussed at Section 6.2.3, the AAQG includes criteria for assessing effects on ecology. The criteria are divided into critical levels for ambient concentrations of acid gases on plants, which generally reflect short term effects (particularly focussed on SO_2 and NO_x) and critical loads for assessment of deposition of air pollutants into ecosystems, which are generally reflective of longer-term effects (particularly of nitrogen and sulphate). The critical load/critical level concept has subsequently been adopted by the WHO (1996). Due to their comprehensiveness and international acceptance, this concept is considered a valid management tool.

Critical levels are able to be compared to the monitoring data from 64 Glenbrook Beach Road (Site 20) (which is considered to be the worst affected based on it being in the dominant wind direction). In addition, deposition rates for critical loads have been calculated based on the monitoring data to evaluate the potential for effects on terrestrial ecology. The following conclusions are drawn:

- The critical level or critical loads for ambient NO_X or nitrogen deposition respectively are able to be complied with;
- Critical levels for ambient SO_2 for agricultural crops (30 ug/m^3 as an annual average) and for natural vegetation (20 ug/m^3 as an annual average) are able to be complied with; and
- The AAQG identifies three critical levels (as annual average concentrations) for SO_2, the most restrictive of which is the level specified for lichens of 10 µg/m^3. Maximum annual average monitoring data available at locations downwind of the predominant wind direction show that the impact of SO_2 levels on ecosystems is within criteria to avoid adverse effects on sensitive lichen species and therefore well within the criteria for the other types of ecosystems.

Sensitive ecological areas are identified in the AUP (as Significant Ecological Areas) and are shown on **Figure 2.7**. These are located south east of the Steel Mill and not in the dominant wind direction. Consequently, the sites are likely to experience lower levels of deposited material, compared to the 64 Glenbrook Beach Road (Site 20) monitoring site. The above assessment is therefore conservative.

7.6.2 Effects of aerial deposition to water

In order to understand the extent of aerial deposition of contaminants to water and ultimately the coastal marine area (CMA), marine sediments have been assessed in the Marine Ecology Assessment, prepared to support NZ Steel's separate application to replace existing water discharge permits[62]. The Marine Ecology Assessment looks at the cumulative effects of all water discharges

[62] Prepared to support the application for water discharge replacement consents, to be lodged in June 2021 (Marine Ecology Assessment for Water Discharge Consent Replacement, Tonkin and Taylor 2021).

from the Steel Mill (within which contaminants from aerial deposition might get entrained), as the Waiuku Estuary is the ultimate receiving environment.

The Marine Ecology Assessment showed that the metals of concern in the adjacent marine sediment are copper, lead and zinc. Further assessment was undertaken to assess whether aerial metal deposition is a contributing source of these metals.

The analysis undertaken indicates that the average copper and lead deposition rates at the NZS Northern Boundary (Site 4B) and 64 Glenbrook Beach Road (Site 20) monitoring sites were marginally lower than the copper and lead deposition rate at Boundary Road (Site 18), indicating that aerial deposition of copper and lead are not influenced by Steel Mill activities because the prevailing wind conditions would carry metals toward the NZS Northern Boundary (Site 4B) and 64 Glenbrook Beach Road (Site 20). If the Steel Mill were the source, higher deposition rates would be expected at these monitoring sites.

As for zinc, deposition rates at the NZS Northern Boundary (Site 4B) monitoring site showed a higher average rate than those observed at 64 Glenbrook Beach Road (Site 20) and Boundary Road (Site 18) indicating that the NZS Northern Boundary (Site 4B) monitoring site is more likely being influenced by landfill activities than iron and steel making activities.

Based on these findings, it is unlikely that aerial deposition would be a significant contributor of metals into water (via stormwater, freshwater and ultimately the CMA).

7.6.3 Effects on horticulture

As mentioned at Section 2, kiwifruit orchards have established in the area surrounding the Site.

So far as NZ Steel is aware there have been no complaints or concerns raised by horticultural growers over the life of the Steel Mill with respect to impacts of air discharges on crop growth.

Annual sampling and reporting, on behalf of a selected range of growers, is undertaken to understand the impact of RPCC staining (i.e. ‘rust spots’ as a result of oxidation of RPCC particles) on kiwifruit crops. The percentage of fruit trays lost to staining has been relatively low and stable since 2012. Summary

The proposed Steel Mill discharges of contaminants to air have been assessed in terms of their:

- actual and potential effect on surrounding terrestrial ecological areas;
- contribution to metals in marine sediments as a result of aerial deposition; and
- effects on local horticultural practices.

It is considered that the air discharges are unlikely to adversely affect nearby sensitive terrestrial ecology, contributes very little in the way of aerial deposition of metals that ultimately end up in the CMA and appropriately mitigates and manages effects on kiwifruit.

7.7 Landscape, visual amenity and natural character effects

The visible discharges to air from the Steel Mill activities have the potential to result in adverse landscape, visual amenity and natural character effects.

The Steel Mill is part of an existing lawfully established industrial environment. Therefore, the discharges to air are seen within the context of existing industrial buildings and structures within the Operational Area, as anticipated by the Heavy Industry Zone and the Glenbrook Steel Mill Precinct as prescribed by the AUP.

The most visible air discharges from the Site are associated with the tall stacks, notably the largest associated with the Iron Plant and to lesser extent, activities that result in fugitive emissions such as

iron plating (unsuppressed) and slag tipping. It is the visible emissions produced by the Steel Mill that have been assessed in the following sections.

7.7.1 Visual effects

In terms of visual amenity, the Landscape and Visual Assessment (**Appendix G**) states that it is largely the steam emissions from the main stacks that attract attention. Other discharges such as iron plating orange-brown fume and fugitive emissions are visible, but short lived.

To understand the visibility of the emissions, photographs were taken from 15 different viewpoints ranging from two to 25 km away and from varying angles where the emissions could be seen. The existing air discharges were then 'removed' from the photograph so that direct comparisons could be made between the scenarios of with and without air discharges. The key conclusions were based on distance from the Steel Mill:

- Beyond five to 10 km from the Site, the visual emissions are a very minor visual component of the wider landscape and consequently have negligible implications on the existing visual amenity;
- In the five to 10 km range, topography and vegetation also aid in limiting visibility of the emissions from publicly accessible locations; and
- Within five km, the Steel Mill is seen in the context of the rural or coastal environment and the permanent residential population of Waiuku township. When the Steel Mill is viewed from an urban context such as the permanent residential population of Waiuku township it appears less incongruous than when viewed from a rural or coastal context.

The Landscape and Visual Assessment also comments on the visual effects of other discrete discharges to air including gas flaring and iron plating. The gas flaring (from the KOBM stack) is noted to be intermittent but from close proximity it is quite dramatic, however the effect diminishes with distance from the Site. Iron plating (when fume is unsuppressed) results in a periodic, smaller scale, brown emission. Although the iron plating emission dissipates quickly, it is likely to elicit a more negative response from the viewing audience due to the associations of the colour with perceived 'pollution'. This type of discharge will now however be largely mitigated by the introduction of new suppression techniques that effectively eradicates the oxidation process that creates the visible plume when pouring molten iron into the open excavated pits.

The Landscape and Visual Assessment concludes that the visibility of the emissions is strongly influenced by weather conditions such as temperature, wind speed and direction and cloud cover. Also, the sensitivity of the viewing audience is tempered somewhat by the distance from the Steel Mill and the fact that is has been an established component of the local area for over 50 years, to a point where it is a key part of the local identity as well as the social fabric of the area. Additionally, the visibility of the discharges at night are very low as the wider landscape is assimilated by darkness.

Overall, the visual amenity effects of the air discharges subject to this application have assessed to be less than minor.

7.7.2 Landscape effects

Landscape character results from a combination of physical elements together with aesthetic and perceptual aspects that combine to make an area distinct. Landscape character is influenced by natural and built elements as well as types, patterns and intensity of land-use, historic, cultural and other intangible qualities.

The Landscape and Visual Assessment concludes that:

- Air emissions will not significantly alter the ingrained influence on the landscape character and values associated with the setting they are viewed within, rather they are a secondary phenomenon associated with an industrial complex; and
- Given the distance from the Steel Mill to any identified Outstanding Natural Landscape (ONL), Outstanding Natural Feature (ONF) and area of Outstanding Natural Character (ONC) as identified in the AUP, the air discharges will have an insignificant influence on the character and qualities of those areas.

Overall, the effect of the air discharges on landscape values have been assessed to be less than minor.

7.7.3 Effects on natural character

Natural character in landscape terms relates to the degree of 'naturalness' of a landscape. Natural character is primarily determined by the nature and extent of modification to a landscape and comprises natural elements appearing in natural patterns, underpinned by natural processes.

Although largely rural, the landscape setting has still undergone significant modification as part of settlement and historic productive land use. As a result, the parts of the wider area that retain the highest natural character values are generally the more remote parts of the Awhitu Peninsula.

It is considered that air emissions reinforce the established industrial character of the Site, without appreciably exacerbating the influence that heavy industry already has on the perception of natural character in the vicinity. Consequently, any adverse effects on natural character generated by the air discharges would be less than minor.

7.8 Cultural effects

7.8.1 Overview

Air is considered a taonga (treasure) by Māori. Degraded air quality can diminish mauri which upsets the balance within a system and affects the relationship between people and the environment, and the ultimate health of all living things. In accordance with the RMA, NZ Steel recognises that Māori relationships with land and water are a matter of national importance and regard must be had to their role of kaitiakitanga (guardianship).

This AEE describes the management of air discharges and the resulting actual and potential effects on human health and the environment. NZ Steel has been working with local mana whenua to understand the potential cultural effects associated with the discharges to air from the Site.

NZ Steel has a long-standing relationship with Ngāti Te Ata and Ngāti Tamaoho and has undertaken specific engagement with both parties in relation to this application. NZ Steel is committed to strengthening its existing relationship with local iwi and to fostering mutual respect. Cultural and traditional activities might be affected by the Steel Mill's discharges to air, and the importance of consultation and discussion is recognised.

7.8.2 Ngāti Te Ata

NZ Steel has worked together with representatives of Ngāti Te Ata to prepare a document that identifies relevant Ngāti Te Ata cultural values, together with NZ Steel's response in relation to management of effects arising from Steel Mill activities. A copy of this document is provided at **Appendix I**.

In summary, Ngāti Te Ata are interested in the adverse effects of air discharges on human health, the environment and cultural values and practices. Specific matters raised by Ngāti Te Ata (via Ngāti Te Ata Environmental Manager, Karl Flavell) include:

- Health of their people – many people believe the Steel Mill is an example of this, where years of air discharge have played their part in the demise of health (such as lung infected illnesses) in many of our kaumatua and people over the years;
- Reduction in visibility to waahi tapu and ancestral maunga. It is important that sightlines are not impeded upon air discharges as when undertaking karakia (prayers) and mihi (speeches) on our marae, people always turn to face our special places, wāhi tapu and maunga;
- Deposition of air pollutants onto mahinga kai (where food and resources are traditionally gathered);
- Increase in noise pollution and light pollution as a result of air discharges;
- Odour effects; and
- Cumulative effects.

Both Ngāti Te Ata and NZ Steel are committed to ongoing engagement on matters relating to NZ Steel's operations. A full copy of the consent application will be provided upon lodgement and NZ Steel anticipates further discussion with Ngāti Te Ata on the key findings and recommendations. Ngāti Te Ata is a member of NZ Steel's Environment Committee. Meetings are held every four-months and these are proposed to continue by way of condition of consent (**Appendix L**). This is an opportunity for Ngāti Te Ata to review NZ Steel's performance against the resource consent conditions, including reviewing any proposed and actual improvements.

7.8.3 Ngāti Tamaoho

Ngāti Tamaoho has a statutory acknowledgement which includes the CMA area adjacent to the Steel Mill and NZ Steel acknowledge the relationship that Ngāti Tamaoho have with the area. Ngāti Tamaoho have provided a letter (a copy of which is provided at **Appendix I**) which provides approval in principle for the continuation of the air discharges on the basis of ongoing meaningful engagement and consultation.

Within the letter, Ngāti Tamaoho outline the potential cultural effects associated with the air discharges. These include:

- Deposition of air pollutants onto mahinga kai (places where food and resources are traditionally gathered), and waahi tapu (sacred places) taonga tuku iho;
- Reduction of visibility;
- Increase in airborne smell; and
- Impact of contaminants on important or valued sites.

As such, Ngāti Tamaoho recommend conditions to manage the air discharges including continual monitoring of the discharge of contaminants, a strict cleaning regime, proviso of an Emergency Containment Plan.

NZ Steel acknowledges the response from Ngāti Tamaoho and considers that the proposed conditions (provided at **Appendix L**) support the letters recommendations. The proposed conditions include continual monitoring of discharge of contaminants and the provision and implementation of an AQMP which describes the management and operational procedures, methodologies as well as contingency plans necessary to comply with the conditions of consent. A number of other recommendations are made in the letter and these are addressed by way of this AEE or proposed conditions. Of particular note, Ngāti Tamaoho recommends a regular (10 yearly) review for the

duration of the consent term. NZ Steel is proposing a five yearly reporting condition and in addition there is the standard section 128 review condition.

A full copy of the consent application will be provided to Ngāti Tamaoho upon lodgement and NZ Steel anticipates further discussion with Ngāti Tamaoho on the key findings and recommendations. Ngāti Tamaoho is a member of NZ Steel's Environment Committee. Meetings are held every four-months and these are proposed to continue by way of condition of consent (**Appendix L**). This is an opportunity for Ngāti Tamaoho to review NZ Steel's performance against resource consent conditions, including review of proposed and actual improvements.

7.8.4 Discussion

As discussed above, specific engagement regarding the application has occurred with both Ngāti Te Ata and Ngāti Tamaoho. Ongoing engagement will continue with Ngāti Te Ata and Ngāti Tamaoho as part of the Steel Mill's standing Environment Committee. Through this forum, as discussed at Section 10, representatives are kept informed of environmental performance, any complaints made and any decisions regarding improving management practices.

NZ Steel also recognises that a number of groups have made applications for customary marine title or protected customary rights in the area relevant to the Steel Mill (the Manukau Harbour, and in particular the Waiuku Estuary). In accordance with the Marine and Coastal Area (Takutai Moana) Act 2011, NZ Steel has notified and sought the views of these groups. with the only response received from Ngāti Te Ata (as discussed at Section 10).

The Steel Mill is existing and will continue to manage the effects of its air discharges through active management, conditions of consent and ongoing engagement with the Environment Committee upon which representatives from Ngāti Te Ata and Ngāti Tamaoho contribute, in order to mitigate the effect of its discharges to air on cultural values.

7.9 Cumulative effects

Consent replacement applications are unique in that the activity is established and has been operating for some time, such that quantitative data is available to assess the actual effects of the activity. The ambient air quality monitoring data therefore represents the cumulative concentrations of air contaminants as a result of emissions from the Steel Mill (both point source and fugitive), as well as other sources not subject to this application which include NZ Steel's landfill and other background sources (both anthropogenic and non-anthropogenic), as discussed at Section 2.4.

The monitoring data has been evaluated in more detail by looking at concentrations measured when the wind was not blowing from the direction of the Steel Mill. This enables the effects of the Steel Mill to be isolated, in order to assess the effects of the discharges from the Steel Mill. The calculated background levels are provided in Section 2.3 of this AEE.

The full dataset is used when comparing the ambient air quality to the assessment criteria as this is the approach required by the NESAQ. The modelling results for HCl, Cl_2, VOCs and mercury are also compared directly to assessment criteria. However, there are no background levels used for these contaminants as there are not expected to be any appreciable sources nearby besides the Steel Mill. In this way, the effects assessment is appropriately conservative.

In summary, cumulative effects of contaminants from the Steel Mill have been taken into account in the assessment undertaken and the overall level of effect conclusions reached in the sections above have accounted for cumulative effects.

7.10 Effects conclusion

In light of the above, the following conclusions are made:

- The ongoing operation of the Steel Mill (of which discharges to air are an inherent part) results in significant positive effects on the local, regional and national economy through provision of steel resources, employment and contribution to GDP;
- The Site has been assessed to comply with health and ecological assessment criteria for NO_2, NO_x, metals, HCl, Cl_2, VOCs, dioxins and PAHs;
- Analysis of ambient monitoring shows general compliance with the current consent conditions and assessment criteria. While the NESAQ criteria are complied with in all cases for PM_{10}, a small number of exceedances of hourly and 24-hourly values are recorded each year for PM_{10} and there are occasional exceedances of the 24-hour average WHO guideline value at 64 Glenbrook Beach Road (Site 20) for SO_2. The actual and potential health effects of these exceedances have been assessed by an independent public health expert (appended at **Appendix F**) as less than minor overall, and minor on the infrequent sporadic days where the PM_{10} values are exceeded;
- It has been identified that the trending increase in TSP and PM_{10} levels is due to fugitive emission discharges from the Steel Mill, namely coal handling and stockpiling and use of the Site's internal roading network. Additional improvements and mitigation measures have recently been implemented, and additional measures are proposed, to further manage these Fugitive Emission sources. The ongoing management of contaminants in conjunction with a robust monitoring regime will ensure that potential health and nuisance effects of fugitive emissions are able to be managed appropriately;
- Effects of the air discharges on terrestrial vegetation, aquatic environments (through aerial deposition) and local horticulture are minimal;
- Effects of the air discharges on landscape values, visual amenity and natural character are viewed within the context of the existing industrial Site;
- Cultural effects have been taken into consideration and through the ongoing involvement of Ngāti Te Ata and Ngāti Tamaoho on the Environment Committee, and additional consultation and engagement. Consequently, any adverse effects on cultural values have been considered and will continue to be managed; and
- Cumulative effects have been addressed as the ambient monitoring provides data from all sources. The assessment of effects contained above is largely based on the monitoring data, where appropriate and therefore represents a conservative assessment of effects. Background contaminant levels have been provided for context.

8 Consideration of best practicable option

8.1 Overview

There is a range of engineering operational and management controls used to manage discharges to air from the Site. The appropriateness of this suite of measures can be evaluated by considering the extent to which it constitutes the 'best practicable option' (BPO). BPO is defined in section 2 of the RMA as follows:

> *best practicable option, in relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—*
>
> *(a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and*
>
> *(b) the financial implications, and the effects on the environment, of that option when compared with other options; and*
>
> *(c) the current state of technical knowledge and the likelihood that the option can be successfully applied*

The concept of BPO is consistent with the RMA framework, which is focussed on avoiding, remedying or mitigating adverse effects. This is a different approach to concepts used internationally such as "Best Available Technique" (BAT), which are focussed on identifying the best technically and financially viable technologies as the basis for setting emission limits (regardless of the nature and scale of effects). BPO is determined on a site-specific basis, taking into account the nature and scale of emissions and the environmental context.

Policy E14.3(8) of the AUP seeks that the BPO for emissions control and management practices, appropriate to the scale of the discharge and potential adverse effects, is used. Therefore, the policy direction of the AUP requires an assessment of BPO.

The effects of PM_{10} and SO_2 emissions have been identified as having the potential to cause off-site adverse effects of discharges to air from the Site. Discharges of other contaminants meet relevant air quality standards and guidelines and therefore significant investment in further reducing emissions would not be warranted. SO_2 emissions arise from a point source and therefore a review of BPO is provided at Section 8.2. PM_{10} is considered to be as a result of fugitive emissions and is discussed in Section 8.3 below.

8.2 Point source emissions

Under the Main Air Permit (Condition 41), NZ Steel is required to every three years review the best practicable options for point source emission controls including:

- MHF off-gas systems (of which there are four);
- Direct reduction Kilns off-gas systems (of which there are four);
- Melter slagside and metalside tapping fume collection (comprising two baghouses);
- Vanadium extraction and KOBM steelmaking converter (comprising one baghouse); and
- KOBM converter (primary off-gas system).

The review includes an evaluation of the demonstrated performance of the above-mentioned emission control equipment systems and compares them to what might be considered best practice. This includes what alternative technologies may have existed at the time the controls were installed, the selection criteria for the equipment installed and addressing inconsistent performance issues.

The Steel Mill was constructed in the late 1960s and a fivefold expansion of steelmaking capacity occurred in the 1980s, with the manufacturing processes constructed as they currently exist. The equipment installed reflects the technology of the era in which each of the components of the Steel Mill were constructed. If a new Steel Mill were built today, it would use fundamentally similar emissions abatements techniques, such as wet scrubbers, baghouses, etc. With advancements in technology there may be differences in equipment selection for some processes, or in the details of engineering design or process control. However, the Steel Mill is one of the largest industrial facilities in New Zealand and the scale of processes and equipment means that replacement or retrofitting with new technology is very expensive and would only be considered where it was warranted to manage an identified adverse effect on the environment.

While the discharges of SO_2 from the Site do not cause any exceedance of the New Zealand ambient air quality guidelines and standards, the occasional exceedances of the 24-hour average WHO guideline value have warranted a review of options for reducing SO_2 emissions. The primary method to minimise SO_2 emissions at the Site is to continue to source coal with a relatively low sulphur content (as required by Condition 16 of the Main Air Permit). The current limit of 0.5% sulphur content of coal used in the process remains appropriate, as lower sulphur coal is not always commercially available and, at times, NZ Steel needs to blend the coal grades to meet the consent limit.

The AQA addresses the feasibility of emission abatement techniques to further reduce emissions of SO_2. This includes a review of the Bluescope Port Kembla facility, which is adjacent to an urban area, and has installed a dry flue gas desulphurisation system. The process is based on adsorption of SO_x (and other contaminants) onto activated coke. The activated coke is regenerated by driving the SO_x off the adsorbent to produce a SO_2-rich gas stream. The recovered gas is then further processed into gypsum to make a saleable product. The regeneration of the coke (for re-use) is necessary to minimise ongoing costs of purchasing adsorbent materials and to avoid creating a large volume of solid waste that needs to be disposed.

A high-level cost estimate of NZ$48M has been made for installing a similar system at the Steel Mill, although the actual costs are likely to be higher[63].

The cost of installing this system significantly outweighs the benefits (i.e., relative reduction in SO_2 emissions) it would derive. Therefore, the existing requirement to minimise the sulphur content of the coal as fed to the MHFs (to a maximum of 0.5% by weight), by way of condition of the consent, is considered to be BPO and a reduction of this limit is not warranted.

8.3 Fugitive emissions

Evaluation of particulate monitoring data shows that, based on the scale of the fugitive emissions experienced off-site and their relative potential adverse effects (discussed in Section 7 above), a BPO assessment for fugitive emissions should be limited to PM_{10}. Through further analysis of PM_{10} contributions off-site, these emissions have been found to be largely attributable to activities such as stockpiling, handling and processing of raw materials, wastes and co-products and heavy vehicle movements.

Although the impact is difficult to quantify, the increased amount of imported coal being transported, stockpiled and handled is likely to be a contributing factor to the increased number of days with high PM_{10} concentrations measured at 64 Glenbrook Beach Road over the last 10 years.

[63] The NZ$48M estimate is based pro-rating the cost of the Port Kembla dry gas desulphurisation plant based on the difference in total volume of gas that would need to be treated at the Steel Mill. Actual costs are likely to be higher as the Steel Mill would require four smaller plants, for each of the MHFs, rather than a single large plant like at Port Kembla.

As the availability of suitable locally-sourced coal declines, NZ Steel will need to continue importing coal from overseas suppliers. Currently, coal is imported via Ports of Auckland, however there is also the potential to use alternative ports, such as Tauranga, in the future. There are limited train lines from Auckland City, no coal terminal at the Port to Rail connection and the constrained network cannot accommodate the required delivery schedule or clear a shipment in the timeframe required by the Port. Therefore, the only practical option is to deliver coal to Site by truck.

Coal shipments are larger and less frequent than domestic deliveries, requiring storage of greater volumes of coal by NZ Steel and proportionally more truck movements to unsealed areas than required for coal sourced domestically. The increased dependence on imported coal has required an overall increase in the quantity of coal stockpiled within the Operational Area compared to when most coal was sourced locally. Due to international supply chains and the variability of frequency and volume of coal shipments, NZ Steel requires a high degree of flexibility around the amount of coal it can stockpile. If on-site coal storage were limited, this would necessitate the establishment and consenting of an off-site stockpile facility which would result in additional handling and would have greater environmental effects.

Increasing quantities of coal being stockpiled increases the surface area available to wind erosion. However, dust emissions are not simply a function of the quantity of coal stored. The height of the stockpile(s) and their orientation to the prevailing winds, as well as any natural or constructed wind breaks (including other stockpiles) will all influence the amount of dust generated. While the configuration of stockpiles and traffic routes are often subject to change to enable operational flexibility, the extent of the Operational Area forms the bounds of these activities on the wider NZ Steel landholding. The effects of dust emissions are also related to separation distance to sensitive locations.

Given the nature of fugitive emissions, the management of them requires a range of techniques including engineering, operational and management controls.

NZ Steel has developed a qualitative fugitive emissions source ranking tool to help to prioritise capital expenditure on improvements to reduce PM_{10} emissions over time. The methodology for fugitive emissions source prioritisation is set out in the AQA (**Appendix F**). In summary, the methodology comprises:

1 Identifying and compiling a list of potential sources at the Site, including sources from roads, stockpiles, and processes;

2 For each dust source, characterise the key factors that describe the likely frequency and magnitude of dust discharges and their potential for effects as this relates to their location and proximity to the boundary and off-site receptors. Dust sources categorised into those from roads, stockpiles, and processes were characterised separately; and

3 Apply a qualitative risk assessment process (such as frequency of activity, proximity to off-site receptor) to prioritise the sources within each category.

The improvements recently prioritised, as a result of undertaking this exercise, are identified in Section 4. They are considered to be the best methods for minimising the adverse effects arising from fugitive emissions and are readily implementable. As several of these measures have only recently been implemented or are proposed to be implemented in the short term, the effectiveness in reducing ambient PM_{10} at the boundary of the Site is yet to be fully determined. NZ Steel proposes to regularly review and assess whether additional improvements are required.

This outcome is supported through the existing Main Air Permit and the proposed conditions of consent which are included at **Appendix L**. More specifically, conditions 10 to 16 of the Main Air Permit specify that activities that contribute to fugitive emissions be controlled and be kept 'to the minimum practicable level'. Ambient investigative trigger conditions ensure that NZ Steel are

accountable for minimising fugitive emission from the Site. Conditions 10 to 16 of the Main Air Permit require:

- Fugitive emissions from RPCC tipping and plating of molten iron be kept to a minimum in accordance with Condition 12, with targets and methods to limit tipping to a practicable minimum;
- That dust generation by vehicle movements shall be maintained at the minimum practicable level. The measures adopted shall include procedures for watering unsealed roads, watering or cleaning of sealed roads, and restricting vehicle speeds on unsealed roads;
- That fugitive emissions of particulate matter from emission control equipment and from handling and transfer of dusty materials shall be maintained at the minimum practicable level. In particular, conveyors carrying dusty materials shall be fitted with drop chutes, and enclosures or covers as appropriate;
- That emissions arising from the tipping of RPCC, and from the plating of molten iron shall be kept to a practicable minimum; and
- That the Consent holder shall ensure that no material is disposed of by open burning in the Iron and Steel Zone.

Proposed conditions are provided at **Appendix L** and largely rely upon these existing conditions with amendments to provide for improvements, where applicable.

A combination of the existing and proposed source control improvements, implementation of an AQMP (included in **Appendix F**) and appropriate conditions of consent (as proposed at **Appendix L**) are considered to represent the BPO to minimise adverse effects of PM_{10} emissions.

8.4 Best practicable option summary

Policy E14.3(8) seeks that the BPO for emissions control and management practices, appropriate to the scale of the discharge and potential adverse effects, is used. It is considered that the source controls and management methods of both point source and fugitive discharges, particularly in relation to SO_2 and PM_{10}, are appropriate to the scale of the discharges and potential adverse effects as discussed in Section 7, to ensure that discharges are minimised as far as practicable.

9 Statutory assessment

This section of the AEE assesses the project against the key provisions of the RMA and comments on other relevant legislation.

9.1 RMA assessment

Section 15(1)(c) of the RMA states that no person may any discharge any contaminant into air from any industrial or trade premise unless that discharge is expressly allowed by a rule (in an existing or proposed regional plan), a resource consent, a national environmental standard or other regulations.

Section 104, including subsections 104(2A) and 104(2B), of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 of the RMA, when considering an application for resource consent. These are:

Section 104(1)

- Any actual and potential effects on the environment of allowing the activity;
- Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity;
- Any relevant provisions of:
  - a national environmental standard;
  - other regulations;
  - a national policy statement;
  - a New Zealand coastal policy statement;
  - a regional policy statement or proposed regional policy statement;
  - a plan or proposed plan; and
- Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

Section 104(2A)

- The value of investment of the existing consent holder.

Section 104(2B)

- Any planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011 (MACA).

The actual and potential adverse effects of the proposal are discussed at Section 7 of this AEE and the mitigation measures are set out in Section 4. An assessment of the relevant provisions of any relevant planning document are set out in Sections 9.2 to 9.4 inclusive below. Other matters that the consent authority may consider relevant to determine the application are identified in Section 9.5 below. The value of investment is set out in Section 9.1.3 and consideration of the MACA is set out in Section 9.1.4.

9.1.1 Part 2 of the RMA

Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the RMA is to promote the sustainable management of natural and physical resources.

The Court of Appeal's decision on *RJ Davidson Family Trust v Marlborough District Council*[64] addresses consideration of Part 2 of the RMA in the context of consent applications. The Court held that reference to Part 2 of the RMA would likely not add anything if "it is clear that a plan has been prepared having regard to pt 2 and with a coherent set of policies designed to achieve clear environmental outcomes"[65]. It is therefore generally not necessary to consider Part 2 of the RMA, unless it is appropriate to do so.

The AUP was made operative following an extensive process of engagement and thorough consideration of all relevant planning documents, in particular Part 2 of the RMA. There is no reason to consider the AUP has not been prepared in a manner that appropriately reflects Part 2 of the RMA. Consequently, the assessment of the proposal against Part 2 below is provided for completeness only.

9.1.1.1 Section 5 – Purpose

Section 5(1) of the RMA states that the purpose of the RMA is to promote the sustainable management of natural and physical resources, with sustainable management defined in section 5(2). The proposal has been assessed against section 5 and is considered to be consistent with the purpose of the RMA as summarised below:

- The ongoing operation of the Steel Mill will continue to provide for the social and economic well-being of the Glenbrook community into the future through employment generation and will also contribute significantly to the economic well-being of the wider Auckland regional economy, and the national economy through the continuation of steel manufacturing and export.
- The cultural well-being of Mana Whenua (in particular, Ngāti Te Ata and Ngāti Tamaoho) will continue to be provided for through the involvement of representatives on the Environment Committee.
- The life supporting capacities of air, water and soil and ecosystems will be safeguarded by robust operating practice, environmental management and monitoring regimes.
- Potential adverse effects from the ongoing operation of the Steel Mill will be avoided, remedied or mitigated through robust management measures and operational procedures (particularly as controlled through management plans and proposed conditions of consent).

9.1.1.2 Section 6 – Matters of National Importance

Matters of national importance, which are to be recognised and provided for, are set out in section 6 of the RMA. Of particular relevance to this proposal is: "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga" (section 6(e)).

As described above, the relationship of Māori to air, which is considered taonga, is provided for through ongoing involvement of Ngāti Te Ata and Ngāti Tamaoho representatives on the Environment Committee and Ngāti Te Ata's assessment of values provided as part of this consent application (provided as a condition of consent at **Appendix L**).

9.1.1.3 Section 7 – Other Matters

Section 7 of the RMA sets out other matters to which particular regard must be had when exercising functions and powers under the RMA. Of particular relevance to this proposal are:

(a) Kaitiakitanga;

[64] [2018] NZCA 316.
[65] At [74].

(b) The efficient use and development of natural and physical resources;

(c) The maintenance and enhancement of amenity values;

(d) Intrinsic values of ecosystems;

(f) Maintenance and enhancement of the quality of the environment; and

(g) Any finite characteristic of natural and physical resources.

The following comments in respect to the above other matters are made:

- Representatives from Ngāti Te Ata and Ngāti Tamaoho sit within the Environment Committee of the Steel Mill, so as to undertake their role as kaitiaki;
- Given this consent application is seeking to replace Existing Consents, it is considered that the proposed continuation of activity at the Steel Mill is an efficient use of natural and physical resources. Similarly, the continuation of the Steel Mill activities will provide for maintenance of amenity values of the area as the communities surrounding the Steel Mill are accustomed to its presence;
- The operation of the Steel Mill is appropriately controlled through a suite of management plans, procedures and consent conditions which ensure that the quality of the environment is maintained and, where possible, enhanced; and
- The Steel Mill manufactures products which use finite natural resources including coal and ironsand. There are existing economic imperatives that provide for the efficient use of these resources and the production of these products will cease when it is no longer economically viable to continue performing this process.

9.1.1.4 Section 8 – Treaty of Waitangi

Section 8 requires those exercising powers or functions under the RMA to take into account the principles of the Treaty of Waitangi.

NZ Steel has an ongoing relationship with iwi in the area and both Ngāti Te Ata and Ngāti Tamaoho are familiar with NZ Steel's operations. NZ Steel has engaged with Mana Whenua (as outlined in **Appendix I**) and will continue to engage to ensure that their culture and traditions, and their ancestral land and water are considered and that the principles of the Treaty of Waitangi are taken into account.

Overall, based on the assessment undertaken as part of this application, it is considered that the proposal is aligned with the purpose of the RMA, consistent with sections 5, 6, 7 and 8 of the RMA.

9.1.2 Section 95A – public notification of consent application

The applicant requests that the application be publicly notified. In accordance with section 95A(2)(a) and 95A(3)(a) of the RMA. Public notification is therefore mandatory.

9.1.3 Section 104(2A) – value of the investment

Section 104(2A) of the RMA requires that consent authorities, when considering an application affected by section 124[66], must have regard to the value of the investment of the existing consent holder.

The Steel Mill is a long-standing industrial facility that has been developed with significant investment over many decades to be what it is today. It is a regionally and nationally significant

[66] Section 124 relates to the exercise of a resource consent while applying for a new consent.

industry that makes a significant contribution to the economic and employment sectors in the south Auckland area and beyond.

The value of the investment of NZ Steel as the existing consent holder is significant on any measure. Using historical information[67], original costs are valued in the order of $2 billion and the current book value (original cost less depreciation) is in the order of $0.5 billion. Replacement cost for the assets (and NZ Steel's insured value) is $5.1 billion and this most closely represents the value of the investment in current financial terms. Further, NZ Steel invests more than $100 million each year on maintaining and improving the assets, including environmental improvements.

9.1.4 Section 104(2B) – customary marine title groups

Section 104(2B) of the RMA requires that the consent authority, when considering a resource consent application for an activity in an area within the scope of a planning document prepared by a customary marine title group, must have regard to any resource management matter set out in that planning document.

The Marine and Coastal Area (Takutai Moana) Act 2011 (MACA) creates a no-ownership regime over the marine and coastal area and introduces mechanisms to recognise customary rights of Māori in that area. These mechanisms include "protected customary rights" (PCRs) and "customary marine title" (CMT). Iwi, hapū and whānau can apply to have PCRs or CMT recognised either through High Court proceedings or by engaging directly with the Crown.

All CMT and PCR applications were required to be lodged by 3 April 2017[68]. There are approximately 35 High Court applications and 30 applications with the Crown in the Auckland Region. There are currently no planning documents prepared by CMT groups in the Auckland Region.

As discussed further at Section 9.5.2.2 below, NZ Steel has notified parties in accordance with section 62(3) of the MACA as there are CMT applications which apply to the coastal area of the Waiuku Estuary directly adjacent to the Steel Mill. The only response received was from Ngāti Te Ata (as discussed at Section 10).

9.1.5 Section 104E – applications relating to discharge of greenhouse gases

In accordance with section 104E, when considering an application for a discharge permit for the discharge of greenhouse gases into air, a consent authority must not have regard to the effects of such a discharge on climate change except to the extent that the use and development of renewable energy enables a reduction of greenhouse gases into the air.

Section 104E of the RMA therefore restricts the Council's ability to consider effects on climate change as part of the resource consent process. As such, an assessment of the effects of the Steel Mill operations on climate change has not been undertaken as part of this AEE.

The Resource Management Amendment Act 2020 (RMAA 2020) repeals section 104E. However, section 104E is still applicable to this application pursuant to sections 2(3) and 2(4) of the RMAA 2020, which provide that the repeal of section 104E does not come into force until 31 December 2021, unless the Governor-General by Order in Council specifies otherwise. Schedule 12 of the RMA, clause 26(2) and (3) confirms that applications for resource consents lodged with a local authority prior to the repeal of section 104E are to be determined as if section 104E is still in effect.

[67] Personal communication – email correspondence between Ron Gillespie and Jennifer Carvill dated 11 March 2021
[68] MACA, section 100.

9.1.6 Sections 105 and 107 – matters relevant to certain applications

Sections 105 and 107 are relevant to applications for discharges under section 15 of the RMA.

Section 105 requires the consent authority to have regard to the nature of the discharge and the sensitivity of the receiving environment, the applicant's reasons for the proposed choice and possible alternative methods of discharge.

This application seeks to replace the Existing Consents for the Steel Mill and the existing investment and location of Steel Mill infrastructure constrains the ability to consider alternative discharges or receiving environments. Matters relevant to section 105 have also been addressed throughout the AEE, particularly in:

- Section 2 which describes the receiving environments;
- Section 3 which describes the Steel Mill operations and key discharges to air;
- Section 7 which assesses the effects on the environment; and
- Section 8 which considers the application of the best practicable option for emission control and management practices.

Consequently, it is considered that the required matters for consideration in relation to section 105 have been addressed in this application.

Section 107 restricts the granting of discharge permits in certain circumstances, namely if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:

- The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- Any conspicuous change in the colour or visual clarity;
- Any emission of objectionable odour;
- The rendering of fresh water unsuitable for consumption by farm animals; and
- Any significant adverse effects on aquatic life.

Aerial deposition of contaminants would not be a significant contributor compared to entrainment of material from the Site in stormwater and subsequent discharges of treated stormwater. Therefore, the discharges from air will not result in any conspicuous oil, grease, films, scums, films, floating or suspended material, nor will it change the colour or visual clarity of receiving waters.

In addition, the discharges to air do not emit any objectionable odour beyond the boundary of the Site, it does not affect the freshwater that is consumed by farm animals, nor will it result in any significant adverse effects on aquatic life.

Overall, it is concluded that the discharge would not give rise to any of the effects set out in section 107(1)(c) to (g). Therefore, it is submitted that section 107 does not prevent Council from granting the consents sought in this application.

9.1.7 Section 124 – exercise of resource consent

Section 124 sets out that a consent holder may continue to operate under an existing consent until a new consent is granted and all appeals are determined[69]. In order to continue to operate under

[69] RMA, section 124(3).

section 124, a consent holder must apply for a new consent for the same activity, at least six months before the expiry of the existing consent[70].

Both the Main Air Permit and the Commercial Iron Plating Air Permit expire on 1 November 2021. Six months prior to this expiry date is 1 May 2021. This application seeks a replacement consent for those discharges and has been lodged prior to 1 May 2021, therefore section 124 applies.

9.1.8 Schedule 4, Clause 6(1)(a) – significant adverse effects

It is noted that the proposed discharges from the Steel Mill will not result in significant adverse effects on the environment and therefore Schedule 4, Clause 6(1)(a) is not applicable to this application.

9.2 National Policy Statements

9.2.1 Overview

National policy statements state objectives and policies for matters of national significance that are relevant to achieving the purpose of the RMA. The national policy statements that are potentially relevant to this application for an air discharge permit for the Steel Mill are:

- New Zealand Coastal Policy Statement 2010 (NZCPS);
- National Policy Statement for Freshwater Management 2020 (NPSFM); and
- National Policy Statement for Urban Development 2020 (NPSUD).

9.2.2 New Zealand Coastal Policy Statement

The purpose of the NZCPS is to state objectives and policies to achieve the purpose of the RMA in relation to the coastal environment of New Zealand[71]. The coastal environment is not limited to the CMA[72]. The Environment Court recently held that it was satisfied that the AUP has given effect to the NZCPS[73]. However, for completeness, this AEE has outlined the most relevant provisions and its application to the proposal.

The focus of the NZCPS is not on discharges to air. The discharges to air are only relevant to the NZCPS in so far as air discharges may settle within and affect coastal environments addressed by the NZCPS. For the purpose of this application, assessments under the NZCPS include consideration of land use activities above mean high water springs that may affect water quality in the coastal environment[74].

Policy 23 relates to discharges of contaminants. As the ultimate receiving environment, the monitoring data from the CMA is reflective of cumulative impacts of discharges from the Site, including any contaminants deposited on the ground as a result of aerial deposition. As discussed in Section 2.4.1, the predominant wind direction blows away from the CMA and therefore it is more likely that contaminants as a result of aerial deposition would enter the CMA as a result of becoming entrained in stormwater. Stormwater on-site is treated prior to discharge into the CMA. Analysis has also shown that the metals of concern in the marine sediments are different to those that were identified as having potential effects in roof-water collected samples. Therefore, it is likely that aerial deposition of contaminants will have very little influence on the discharge of contaminants in the marine environment.

[70] RMA, section 124(1).
[71] NZCPS, Preamble.
[72] NZCPS, Policy 1.
[73] Auckland Council v Auckland Council [2020] NZEnvC 070 at [44].
[74] NZCPS, Policy 4.

Furthermore, in accordance with Objective 6 of the NZCPS, granting consents to allow the ongoing operation of the long-established Steel Mill activity will recognise that the activities are functionally bound to the coastal environment given their existing location, and that the continued use of the natural resources on the Site within the limits sought is vitally important to the social and economic wellbeing of the people and community at Glenbrook and the wider Auckland region.

Based on the above, the proposed continuation of air discharges associated with the operation of the Steel Mill is not inconsistent with the NZCPS.

9.2.3 National Policy Statement for Freshwater Management

The NPSFM came into effect on 3 September 2020. Similarly to the NZCPS above, the discharges to air are only relevant to the NPSFM to the extent that air discharges may settle within and affect freshwater environments or other receiving environments (such as estuaries and wider CMA).

As discussed at Section 7.6.2, the potential for aerial deposition of dust from the Site contributing to the loading of metals in freshwater and other applicable receiving environments (covered by the NPSFM) is low.

Based on this finding, the proposal is not inconsistent with the NPSFM as it does not prevent the management of natural and physical resources in a way that prioritises the health and well-being of water bodies and freshwater ecosystems, the health needs of people, and the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future (NPSFM, Objective 1).

In addition, as previously noted, NZ Steel has an ongoing relationship with Mana Whenua and this engagement includes freshwater management engagement and decisions (in accordance with Policies 1 and 2 of the NPSFM).

Overall, by granting the resource consents, the Glenbrook community and wider Auckland region, will be able to continue to provide for their social, economic and cultural well-being in a way that is consistent with the NPSFM[75].

9.2.4 National Policy Statement for Urban Development

The NPSUD came into effect on 20 August 2020. One purpose of the NPSUD is to ensure growth is strategically planned and leads to well-functioning urban environments that enable communities to provide for their social, economic, and cultural well-being and for their health and safety (Objective 1).

The focus of the NPSUD is not on discharges to air. Discharges to air are only relevant to the NPSUD in so far as air discharges may affect the provision of well-functioning urban environments. Strategic planning can influence communities' exposure to air pollution (particularly for vulnerable groups such as children and the elderly) and the type of contaminants communities are exposed to because of land-use decisions such as zoning and consenting.

Although the Steel Mill is not located specifically within an urban environment, it is located within the Auckland Region which is classified by the NPSUD as a Tier 1 urban environment. The existing nature of the Steel Mill means that appropriate zoning and land use provision has been made for the activity and its surrounds to minimise off-site effects of its air discharges. Therefore, the ongoing discharges to air associated with the operation of the Steel Mill is consistent with the NPSUD in so far as it enables people to provide for their economic wellbeing and employment opportunities in

[75] NPSFM, Policy 15.

accordance with Objective 1. The Steel Mill's contribution to the economy is described at Sections 7.2 and 9.1.5.

9.3 National Environmental Standards

9.3.1 National Environmental Standards for Air Quality

The Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) came into effect in 2004. The Standards are technical environmental regulations prepared in accordance with sections 43 and 44 of the RMA. They are designed to protect public health and the environment in New Zealand, by setting concentration limits for clean air and regulating or prohibiting certain activities that pollute the air.

Regulation 17 of the NESAQ restricts the granting of resource consent for new or increased discharges of PM_{10}. The restrictions of Regulation 17 apply if the discharge would be likely to increase 24-hour average PM_{10} concentrations in a "polluted" airshed by more than 2.5 $\mu g/m^3$ (unless the new emissions can be offset by equivalent reductions in PM_{10} emissions within the airshed). The Site is not located within an airshed gazetted in accordance with the NESAQ and therefore lies within the airshed comprising the mainly rural remainder of the Auckland region. This airshed does not meet the NESAQ definition of "polluted" and as such there is no impediment to the granting of consent under Regulation 17.

Similarly, there is no impediment to granting consent under Regulations 20 or 21 as there were no recorded (or predicted) exceedances of the NESAQ or AAQG values for SO_2, NO_2 and CO over the monitoring period at any of the monitored sites for any of these contaminants.

Regulation 14 of the NESAQ provides the applicability of the ambient air quality standards. Sub-clause (1) states that an ambient air quality standard for a contaminant applies at any place:

(a) That is in an airshed; and

(b) That is in the open air; and

(c) where people are likely to be exposed to the contaminants.

However, sub-clause (2) states that if a discharge of a contaminant is expressly allowed by a resource consent the ambient air quality standard for the contaminant does not apply to the site on which the resource consent is exercised.

As discussed at Section 7.4.1, since about 2012 there have been occasions where PM_{10} levels at the boundary of the Site have been greater than the PM_{10} ambient air quality standard (set in the NESAQ). As these measurements have occurred on an industrial premise that has resource consents for emissions of PM_{10}, they do not constitute a breach of the NESAQ. However, air quality at the 64 Glenbrook Beach Road (Site 20) monitoring site is indicative of PM_{10} concentrations that could be experienced at nearby dwellings.

9.3.1.1 Proposed Amendments

In February 2020, the Ministry for the Environment set out proposed amendments to the NESAQ in a consultation document titled 'Proposed amendments to the National Environmental Standards for Air Quality: particulate matter and mercury emissions – consultation document'.

The amendments propose to introduce $PM_{2.5}$ as the primary regulatory tool to manage ambient particulate matter. The below ambient air quality guideline values for $PM_{2.5}$ are proposed and are those levels recommended by the WHO.

The annual average limit of 10 µg/m^3 would manage long-term impacts from exposure. The daily (24-hour) average limit of 25 µg/m^3 (including no more than three exceedances per 12-month period) would manage the health effects from short-term exposure.

Proposed amendments	
Particulate matter	
$PM_{2.5}$	Daily average $PM_{2.5}$ standard – 25 µg/m^3 (three or fewer exceedances allowed in a 12-month period) Annual average $PM_{2.5}$ standard – 10 µg/m^3 Monitoring required in all airsheds Publicly notify breaches Replace PM_{10} with $PM_{2.5}$ for 'offset' and open fires provisions

Figure 9.1: NESAQ proposed $PM_{2.5}$ amendments

The AQA has assessed $PM_{2.5}$ (at Section 7.4.1.2) in light of these proposed amendments.

The proposed amendments also include changes in relation to mercury as a result of New Zealand signing the Minamata Convention on Mercury in 2013. This is discussed further at Section 9.5.2. To address the obligations under Articles 5(6) and 8 of the Convention, two amendments to the NESAQ are proposed:

1 Prohibit the use of mercury in certain, listed processes known as Annex B processes; and

2 Require applications for specified, new activities involving emissions of mercury to air, known as Annex D sources, to consider international best practice guidance (a combination of best available techniques (BAT) and best environmental practice (BEP))[76].

Annex B processes have not been carried out in New Zealand, and they are not likely to be as technology has improved, removing the need for mercury. Further, the Steel Mill and its operations are not Annex D emission sources. Therefore, the Steel Mill is not subject to either of the proposed amendments.

9.3.2 National Environmental Standard for Sources of Human Drinking Water

The Resource Management (National Environmental Standard for Sources of Human Drinking Water) Regulations 2007 (NES Drinking Water) came into effect in 2008 and sets requirements for protecting sources of human drinking water from becoming contaminated. The NES Drinking Water requires regional councils to ensure that decisions on resource consents and regional plans consider effects on drinking-water sources. Specifically, regional councils are required to:

- Decline discharge or water permits that are likely to result in community drinking water becoming unsafe for human consumption following existing treatment;
- Be satisfied that permitted activities in regional plans will not result in community drinking water supplies being unsafe for human consumption following existing treatment; and

[76] BAT options include taking measures to reduce mercury content in fuel (through washing, selecting or blending), reduce mercury emissions during combustion, and remove mercury as a co-benefit by conventional pollution control systems and mercury control techniques (such as activated carbon injection). Both BAT and BEP should be used together to form best practice. This could include maintaining pollution control strategies and environmentally-sound management of the plant and coal combustion residues.

- Place conditions on relevant resource consents that require notification of drinking water suppliers if significant unintended events occur (e.g., spills) that may adversely affect sources of human drinking water.

Under the regulations, different criteria apply for granting resource consents or writing permitted activity rules depending on whether the drinking water concerned currently meets the health quality criteria or does not meet the health quality criteria as set out in the Drinking-water Standards for New Zealand 2005 (revised 2018).

As described at Section 7.4, the effect of the Steel Mill's air discharges on drinking water quality has been confirmed through roof-collected water testing. All drinking water samples collected to date are below the DWSNZ and derived MAVs and are therefore consistent with the NES Drinking Water.

9.4 Auckland Unitary Plan

The AUP became operative in part on 15 November 2016. The AUP contains the Regional Policy Statement (RPS) and Regional and District Plan objectives and policies. **Appendix K** contains a copy of the provisions that are considered particularly relevant to the application and the sections below contain an assessment of the proposed discharges in relation to the policy direction of the relevant chapters of the AUP.

9.4.1 Chapter B - Regional Policy Statement

Chapter B of the AUP contains the Regional Policy Statement (RPS) for Auckland. Chapter B contains nine issues of regional significance for resource management in Auckland[77]. Chapter B7 – Natural Resources is of particular relevance to this proposal as it contains the objectives and policies pertaining to air. An assessment of the policy direction for air is contained in Table **Table 9.1** below.

Table 9.1: RPS objectives and policies assessment

RPS chapter	Assessment
Chapter B2: Urban Growth	The objectives and policies of Chapter B2.5 seek to enable the supply of land for commercial and industrial activities while managing the effects associated with these land uses. Objective B2.5.1(3) seeks to promote economic development and the efficient use of buildings, land and infrastructure in industrial zones recognising particular locational requirements of certain industries while managing conflict between activities. This is supported by Policy B2.5.2(7) which specifically seeks to enable heavy industrial activities where the scale, character and intensity of effects from those activities can be appropriately managed. The existing nature and longevity of the Steel Mill means that it is well established within its locale and the effects are well understood and appropriately managed. The replacement of the existing consents will enable NZ Steel to continue discharging to air and producing iron and steel and its associated activities. This represents an efficient use of the AUP zoning, land and infrastructure already established on the Site and the significant contribution that the Steel Mill has to the local, regional and national economy (as discussed at Section 7.2).
Chapter B6: Issues of significance to Mana Whenua	The objectives and policies of Chapter B6 recognise the role of Mana Whenua as kaitiaki and provides for integration of mātauranga Māori and tikanga into resource management processes. Of particular importance is Objective (1) and (2)[78] and Policy (1) which recognise the principles of the Treaty of Waitangi and seek Mana Whenua participation and engagement in resource management processes and the sustainable

[77] AUP, B1.4.
[78] AUP, B6.2.1.

RPS chapter	Assessment
	management of natural and physical resources. Engagement with Mana Whenua has been ongoing as detailed in Section 10. Policy B6.3.2(3) seeks to ensure that any assessment of environmental effects for an activity that may affect Mana Whenua values includes an appropriate assessment of adverse effects on those values. This AEE has considered the potential effects on cultural values (Section 7.8) which has been informed by ongoing engagement with Mana Whenua by way of the Environment Committee, site visits, and hui. Key values of importance to Ngāti Te Ata are identified and addressed in **Appendix I**.
Chapter B7: Natural Resources	The objectives and policies of Chapter B7 seek to avoid, remedy or mitigate adverse effects from discharges of contaminants to air for the purpose of protecting human health, property and the environment (Objective B7.5.1(3)) while enabling industry and infrastructure by providing for reduced ambient air quality amenity in appropriate locations (Objective B7.5.1(2)). As an inherently industrial activity, it is recognised that lower ambient air quality can be anticipated. The buffer area around the Operational Area provides physical separation of the discharges from off-site receptors. NZ Steel has operated on the Site since 1968 and is a significant contributor to the local, regional and national economy. The discharges from the Site are managed through an existing suite of consent conditions requiring monitoring and management of discharges. It is proposed that these same monitoring and management conditions will apply to the proposed discharges, albeit with some updating and improvements. The assessment provided at Section 7 concludes that the adverse effects of the discharges to air particularly effects on human health, are no more than minor and therefore are not significant. They are also considered appropriate given the existing use of the Site. For the purposes of integrated management, aerial deposition of contaminants to both freshwater and coastal waters has also been considered and it has been assessed that the contribution of aerial deposition to these environments is minimal.
Chapter B8: Coastal Environment	The objectives and policies of Chapter B8 seek to ensure that subdivision, use and development undertaken within the coastal environment is appropriately located and managed to minimise effects, including those on natural character (Objective B8.3.1(10 and Objective B8.2.1(2). The Steel Mill is an existing element of the coastal environment and the existing and proposed management of air discharges seeks to continue to mitigate effects on the coastal environment. The Landscape and Visual Assessment at **Appendix G** has assessed the effects of the air discharges on natural character and has concluded that they are low.
Chapter B9: Rural environment	The objectives and policies of Chapter B9 seek to support rural production and other activities that support rural communities (Objective B9.2.1(3)), maintain rural character and the values associated with it including avoiding, remedying and mitigation adverse effects that may affect these values or character (Policy B9.2.2(1)). Part of maintaining rural character requires the minimisation of reverse sensitivity effects of the establishment of sensitive activities (Policy B9.2.2(2)). The Steel Mill is a long-established facility within this area surrounded by rural activity and measures are taken (as outlined at Section 4) to avoid and minimise effects of air discharges on the rural environment as far as practicable. The provisions of the AUP ensure that the number of sensitive receptors that can establish in the area is managed, therefore minimising reverse sensitivity effects.

Overall, it is considered that the application to replace the existing air discharge permits associated with the ongoing operation of the Steel Mill is consistent with the RPS.

9.4.2 Chapter D – Overlays

Chapter D of the AUP provides overlay provisions that apply to specific natural and physical resources. Of relevance is Chapter D9, Significant Ecological Areas, given the Site contains two SEAs as described at Section 2.5.5. The relevant objectives and policies of D9 are summarised in **Table 9.2** below.

Table 9.2: AUP Chapter D – Overlays policy assessment

Chapter	Assessment
Chapter D9: Significant Ecological Areas	The objectives and policies of Chapter D9 seek to protect areas of significant indigenous biodiversity values from the adverse effects of subdivision, use and development using the resource management hierarchy of avoid, remedy and mitigate and offset. As described at Section 2.5.5 of this AEE, two small pockets of terrestrial SEA are located in the south-west corner of the Site. Section 7.6.1 concludes that all criteria set out in the AAQG for assessing effects on ecology are able to be complied with. This assessment is based on the monitoring data from 64 Glenbrook Beach Road (Site 20) (downwind of the dominant wind direction being from the south-west) and therefore is conservative for the SEA areas which are outside of the dominant wind direction.

9.4.3 Chapter E – Auckland-wide provisions

Chapter E of the AUP provides Auckland-wide provisions that apply to the use and development of natural and physical resources across Auckland regardless of the zone in which they occur. The objectives and policies within Chapter E which are relevant to the Proposal are summarised below.

Of particular relevance to this application is Chapter E14 in respect of air discharges. Given their inherent importance to this application, each of the relevant objectives and policies of Chapter E14 have each been assessed in **Table 9.2** below. The policy direction of other relevant Auckland-wide provisions is summarised in **Table 9.3**.

Table 9.3: AUP Chapter E – Air - policy assessment

Objective / Policy	Comment
AIR	
Objective E14.2(1) Air quality is maintained in those parts of Auckland that have high air quality, and air quality is improved in those parts of Auckland that have low to medium air quality.	The Steel Mill is zoned Business- Heavy Industry which is associated with lower air quality in recognition of its industrial nature. The proposed air discharges will be subject to the Environmental Management System, mitigation measures and monitoring already in place for the Steel Mill and further measures have been identified at Section 4 to seek to improve the discharges from the Operational Area.
Objective E14.2(2) Human health, property and the environment are protected from significant adverse effects from the discharge of contaminants to air.	As described in Section 3, iron and steel production associated with the Steel Mill results in a range of discharges to air which contain contaminants. Section 7 has assessed the effects of these contaminants on human health, property and the environment and concluded that the actual and potential adverse effects are no more than

Objective / Policy	Comment
AIR	
	minor effects, and none of the effects are considered to be significant. This is largely attributable to the buffer area provided by the Steel Mill landholdings providing separation distance to sensitive receptors, the source controls, and ongoing monitoring and management of discharges.
Objective E14.2(3) Incompatible uses and development are separated to manage adverse effects on air quality from discharges of contaminants into air and avoid or mitigate reverse sensitivity effects.	The location of the Steel Mill minimises reverse sensitivity effects as far as practicable given: Its distance from Auckland CBD; The applicable Heavy Industrial zoning and relevant precinct provisions in the AUP; The buffer provided by the NZ Steel owned land beyond the Operational Area; and The surrounding rural zoning reducing the ability to intensify and develop sensitive activities.
Objective E14.2(4) The operational requirements of light and heavy industry, other location-specific industry, infrastructure, rural activities and mineral extraction activities are recognised and provided for.	The Steel Mill has an operational requirement to discharge contaminants to air as a result of the processes required to produce iron and steel. This objective seeks to provide for these activities to occur. Further, the Steel Mill is locationally constrained by virtue of the extensive plant established at Glenbrook, and by its need to be close to the ironsand mine at Maioro / Waikato North Head. The use of the existing infrastructure already established at the Site recognises the value of the investment already made and the efficient use of existing resources.
Policy E14.3(1) Manage the discharge of contaminants to air, including by having regard to the Auckland Ambient Air Quality Targets in Table E14.3.1, so that significant adverse effects on human health, including cumulative adverse effects, are avoided, and all other adverse effects are remedied or mitigated.	The discharges to air from the Steel Mill operations comply with the Auckland Ambient Air Quality Targets. It is noted that the AAQT for annual average PM_{10} is close to the guideline value. As provided at Section 7, the effects of the air discharges result in no more than minor adverse effects as a result of mitigating and managing the discharges (and additional improvements proposed). Therefore, significant adverse effects, including cumulative effects, as a result of Steel Mill operations will be avoided.
Policy E14.3(2) In the coastal marine area and in urban and rural zones, except for those zones and precincts subject to policies E14.3(3) to (5): (a) avoid offensive or objectionable effects from dust and odour discharges and remedy or mitigate all other adverse effects of dust and odour discharges; or (b) require adequate separation distance between use and development which discharges dust and odour to air and activities that are sensitive to adverse effects of dust and odour discharges, or both of the above.	The land surrounding the Steel Mill is zoned a variety of rural zones and are therefore subject to E14.3(3) while the extent of the Heavy Industry Zone is subject to E14.3(5) below. However, of relevance to this provision is the CMA. The Steel Mill is adjacent to the Waiuku Estuary which is CMA. The predominant wind direction blows inland from a south-westerly direction, away from the CMA, therefore it is unlikely that offensive or objectionable effects would be experienced in this area. Similarly, there are no activities that are sensitive to adverse effects of dust and odour discharges located within the CMA.

Objective / Policy	Comment
AIR	
Policy E14.3(3) In the Rural – Rural Production Zone, Rural – Mixed Rural Zone, Rural – Rural Coastal Zone, Future Urban Zone, Auckland Council District Plan - Hauraki Gulf Islands Rural 1-3 and Landform 1-7: (a) recognise that rural air quality is generally a result of dust and odours, and other emissions generated by rural production activities; (b) avoid, remedy or mitigate adverse effects of dust and odour discharges; (c) provide for minor and localised elevation of dust and odour levels where the air discharge is from: (i) rural production activities or rural industry; or (ii) the operation of infrastructure or location specific industry; or (iii) mineral extraction activities; or (iv) activities undertaken by the New Zealand Defence Force for training and munitions testing; or (v) for emergency services training; (d) require adequate separation between use and development which discharge dust and odour and activities that are sensitive to these adverse effects.	Rural air quality is generally dominated by rural emissions and this policy recognises that this therefore tends to anticipate a lower standard of air quality. The activities that are undertaken within the surrounding rural zones contribute to the background ambient air quality. Dust discharges from the Steel Mill are avoided, remedied and mitigated as far as practicable. Sub-clause (c) provides for localised elevation of dust and odour effects from location specific industry (such as the Steel Mill). Odour effects are negligible, but the Steel Mill does contribute to elevated ambient dust levels about background levels. This is discussed at Sections 7.3 and 7.4. As mentioned in the policies above, adequate separation distance is provided between the Steel Mill and sensitive receptors.
Policy E14.3(5) Support the use and development in the Business – Heavy Industry Zone, Special Purpose – Quarry Zone and Auckland Council District Plan – Hauraki Gulf Islands Commercial 6 Zone by: (a) providing for higher levels of dust and odour provided that any adverse effects on human health are avoided, remedied or mitigated; (b) avoiding the establishment of activities sensitive to air discharges in these zones; and (c) discouraging the establishment of activities sensitive to air discharges in areas adjacent to these zones.	Policy 14.3(5) supports the use and development of the Heavy Industry Zone within which the Steel Mill is located. This zone provides for higher levels of dust and odour. Adverse effects on human health and the environment are managed and mitigated as far as practicable through a range of mechanisms including separation distance, source controls, ongoing monitoring and proposed conditions of consent. Beyond the buffer area provided by NZ Steel, the land surrounding the Steel Mill is zoned for rural purposes (Rural Production Zone to the east and Mixed Rural Zone to the north). The use of these zones discourages activities sensitive to lower ambient air quality and reduces reverse sensitivity effects.
Policy E14.3(6) Avoid the discharge of contaminants to air from industrial activities in rural zones and the coastal marine area except where the activity is: (a) location specific, such as mineral extraction activities and mineral processing, wastewater treatment facilities, marine and port activities; (b)undertaken by the New Zealand Defence Force for training and munitions testing, or for emergency services training;	The air discharges are a location specific industrial discharge and are therefore not required to be avoided. While not strictly infrastructure, the Steel Mill requires large separation distances from sensitive receptors that cannot be provided for within urban areas.

Objective / Policy	Comment
AIR	
(c)infrastructure requiring large separation distances that cannot be provided for within urban areas; or (d)a rural industry	
Policy E14.3(8) Avoid, remedy or mitigate the adverse effects on air quality from discharges of contaminants into air by: (a) using the best practicable option for emission control and management practices that are appropriate to the scale of the discharge and potential adverse effects; and (b) adopting a precautionary approach, where there is uncertainty and a risk of significant adverse effects or irreversible harm to the environment from air discharges.	Section 7 of this AEE demonstrates that the actual and potential adverse effects of the discharges to air from the Steel Mill will be no more than minor. Section 8 considers alternative discharge locations and methods as well as the best practicable option for emission control and management practices. For the Site's point source discharges, the existing pollution control systems are considered to be BPO and have been reviewed three-yearly in accordance with conditions of the Main Air Permit. Without significant capital investment, these are considered to continue to be BPO. Various improvements in fugitive discharge emission control and management practices have been identified and implemented/are proposed to be implemented as discussed at Section 4. The proposed conditions of consent will require fugitive discharges to be kept to a practicable minimum so as to ensure that emission control and management practices are constantly being implemented. It is considered that the proposed mitigation and management is appropriate for the scale of the discharge and the potential adverse effects. There is not considered to be a risk of significant adverse effects or irreversible harm and therefore (b) is not relevant.
Policy E14.3(9) Avoid, remedy or mitigate the adverse effects on air quality beyond the boundary of the premises where the discharge of contaminants to air is occurring, in relation to: (a) noxious or dangerous effects on human health, property or the environment from hazardous air pollutants; or (b) overspray effects on human health, property or the environment.	NZ Steel monitors potential contaminants at five monitoring sites, four of which are beyond the boundary of the Site. As assessed at Section 7, the existing suite of management and mitigation measures is effective in appropriately managing adverse effects on air quality beyond the Site boundary such that they are not noxious or dangerous. Sub-clause (b) is not relevant as there is no proposed overspray.
Policy E14.3(10) Require large scale combustion sources that discharge contaminants to air to avoid, remedy or mitigate any adverse effects on aircraft safety.	The Steel Mill contains large scale combustion sources which discharge contaminants to air. However, given the Steel Mill has existed on this Site since 1968, it is considered that aviation industry is aware of its existence and associated discharges such that it is unlikely that a replacement consent would result in any change to effects on aircraft safety.
Policy E14.3(11) Enable the use of air quality offsets in achieving compliance with relevant standards and other provisions in the plan.	Air quality offsets are not required to achieve compliance with relevant standards and other provisions in the plan.

Table 9.4 below contains summary assessments of other relevant Chapter E Auckland-wide chapters and their applicable policy direction.

Table 9.4: AUP - Chapter E policy assessment

AUP chapter	Assessment
Chapter E1 - Water quality and integrated management	A discussion of air discharges in relation to aerial deposition to water has been included for completeness. As described at Section 7.6.2, the potential for aerial deposition of dust from the Site to contribute to the loading of metals in water (both freshwater and coastal water) has been considered unlikely to be a significant contributor compared to entrainment of material from the Site in stormwater. This analysis has been undertaken by comparing the contaminants of concern in the marine environment (which is the ultimate receiving environment thereby capturing contaminants of concern in freshwater) to the contaminants of concern at the ambient air monitoring stations. The analysis undertaken indicates that the average copper and lead deposition rates at the NZS Northern Boundary (Site 4B) and 64 Glenbrook Beach Road (Site 20) monitoring sites were marginally lower than the copper and lead deposition rate at Boundary Road (Site 18), indicating that aerial deposition of copper and lead are not influenced by Steel Mill activities. As for zinc, deposition rates at the NZS Northern Boundary (Site 4B) monitoring site showed a higher average rate than those observed at 64 Glenbrook Beach Road (Site 20) and Boundary Road (Site 18), indicating that the Northern Boundary (Site 4B) monitoring site is more likely being influenced by landfill activities than iron and steel making activities.
Chapter E18 – Natural Character of the Coastal Area	Chapter E18 is relevant to the application as it applies to activities in the coastal environment in areas that are not scheduled under the Outstanding Natural Character and High Natural Character Overlay but require resource consent. The Steel Mill, and its associated air discharges are located within the coastal environment given its location adjacent the Waiuku Estuary. Of particular note is Policy E18.3 (3)(j) which requires consideration of the functional or operational need of infrastructure to be located in the coastal environment. The longevity of the Steel Mill's existence on the Site means that the Mill has become part of the coastal environment landscape. While the air discharges will be visible from the coastal area, they will not adversely affect the natural characteristics and qualities of the coastal environment, especially in a physical sense. On this basis, it is considered that the ongoing discharges to air from the Steel Mill is consistent with the objectives and policies of Chapter E18.
Chapter E19 – Natural features and natural landscapes in the coastal environment	This chapter also applies to activities in the coastal environment that are proposed in areas that are not scheduled in the Outstanding Natural Features (ONF) Overlay or the Outstanding Natural Landscapes (ONL) Overlay but that require resource consent. However, it is considered not to be applicable because the Site doesn't have particular natural values, natural features that provide a sense of place or have high amenity values. Nor is the Site adjacent to an ONF or ONL.

9.4.4 Chapter H – Zones

Chapter H contains the zones of the AUP. Chapter H16 is relevant to this application for air discharges from the Steel Mill as the Operational Area from which the discharges are emitted, is located within the Business - Heavy Industry Zone. **Table 9.5** below contains a summary assessment of the policy direction of Chapter H16.

Table 9.5: AUP Chapter H – Zones - policy assessment

AUP chapter	Assessment
Chapter H16 – Business – Heavy Industry Zone	Chapter H16 is relevant as the Operational Area is wholly contained within the Business - Heavy Industry Zone. This zone seeks to enable, and to an extent, protect industrial activities such as the Steel Mill. Chapter H16, particularly Objectives H16.2(1) and (2), seeks to ensure that heavy industrial activities are not unreasonably constrained by other activities that may be sensitive to air discharges and noise particularly, while also managing appropriately any adverse effects on the natural environment.
Chapter H19 – Rural Zones	Chapter H19 is relevant to the area of the Site outside of the Heavy Industry Zone (the majority of the buffer area) and beyond the boundary as described at Section 2.5.3. The rural zones seek to enable a range of activities (including their associated features and effects) while limiting a range of other activities that are potentially incompatible. Policy H19.2.4(2) is particularly relevant as it recognises that the use of rurally zoned land gives rise to noise, odour, dust, traffic and visual effects. The buffer area around the Operational Area utilises rurally zoned land to aid in minimising and managing adverse effects such as these from the Steel Mill. Furthermore, the rural zoning restricts subdivision and other activities thereby limiting the number of sensitive receptors that can establish in the area surrounding the Site.

The ongoing operation of the Steel Mill, including its discharges to air, is consistent with the policy direction of the Business – Heavy Industry Zone.

9.4.5 Chapter I – Precincts

Chapter I contains the precincts of the AUP. Chapter I415 is relevant to this application for air discharges as it contains provisions relating to the "Glenbrook Steel Mill Precinct". **Table 9.6** below contains an assessment of the each of the precinct's policy provisions contained at Chapter I415.

Table 9.6: AUP Chapter I – Precinct policy assessment

Objective / Policy	Comment
Objective I415.2(1) The Glenbrook Steel Mill is enabled to contribute to the social and economic wellbeing of the Auckland Region.	This objective seeks to enable the use of the land and the ongoing operation of the Steel Mill in recognition of its contribution to social and economic wellbeing of Auckland (particularly contained within the Economic Impact Assessment contained in **Appendix H**).
Policy I415.3(1) That a range of activities which are necessary to the functional and operational needs of the steel mill are enabled.	This policy recognises that a number of activities, of which discharges to air, are a fundamental requirement to the function and operation of the Steel Mill. Therefore, the air discharges are explicitly enabled by this provision.
Policy I415.3(2) The character and amenity of the rural environment surrounding the steel mill is maintained and noise monitoring is undertaken.	Of relevance to discharges to air, this provision recognises that the Steel Mill creates adverse effects and therefore actively seeks to ensure that the surrounding amenity and character of the rural area is not compromised by the ongoing operation of the Steel Mill. The effects of the continuation of the air discharges from the Steel Mill have been assessed as less than minor in the Landscape and Visual Assessment (contained at **Appendix G)** and in this AEE at Section 7.7.
Policy I415.3(3) The natural character and amenity values of the coastal environment are managed.	This policy recognises the location of the Steel Mill adjacent the CMA and promotes management to manage effects on the natural character and amenity values of the coastal environment. The Landscape and Visual Assessment (contained in **Appendix G**) has

	assessed natural character and amenity values and concludes that the effect of the air discharges on these values is low.

The Glenbrook Steel Mill Precinct seeks to enable the Steel Mill's activities related to its function and operation in order to contribute to the social and economic wellbeing of the Auckland Region, while managing the character and amenity values of both the adjacent rural and coastal environments. Therefore, the application is consistent with the policy direction of the Glenbrook Steel Mill Precinct.

9.4.6 Summary

The discharges to air from the Site are an operational and functional need of the Steel Mill and will contribute to Auckland's social and economic wellbeing, while ensuring effects are appropriately managed. The application to replace the air discharge permits required for the ongoing operation of the Steel Mill is consistent with, and in many ways, expressly supported by the policy direction of the AUP.

9.5 Other matters

9.5.1 Realistic future use of the Site

Section 7 provides an assessment of effects of the discharges to air, as a result of the operation of the Steel Mill (in accordance with section 104(1)(a)), while Section 2.4 has presented the anticipated background ambient air quality without the contribution from the Steel Mill (should it cease operations). Pursuant to section 104(1)(c), it is appropriate to consider the reasonably likely alternative use of the Site (and the effects from such use) should the consents for the Steel Mill not be renewed and to consider the effects of the ongoing discharges to air from the Steel Mill in that context.

The Site is zoned for heavy industrial land use and therefore it is reasonably likely that, should the Steel Mill operation cease, the Site would be repurposed for an alternative use of an industrial nature, particularly if that use were able to modify or repurpose the existing structures and infrastructure. Industrial activity is defined within the AUP as "the manufacturing, assembly, packaging or storage of products or the processing of raw materials and other accessory activities". Therefore, alternative uses could include, but are not limited to, depots (such as freight, rail or bus), manufacturing, storage or wholesaler. While not all of these uses would result in discharges to air, an alternative use of the Site could result in discharges to air. Thereby, while not quantified as part of the assessment of effects, it is appropriate to note that it would not be fanciful to assume that a future use of the Site would also contribute discharges to air.

9.5.2 Other statutory documents relevant to the application

9.5.2.1 Statutory Acknowledgements and Deeds of Settlement

Of relevance to this application is the Ngāti Tamaoho Claims Settlement Act 2018 (specified in Schedule 11 of the RMA). This Act acknowledges and apologises to Ngāti Tamaoho for confiscated lands in which the iwi had interests in and gives effect to provisions of the deed of settlement that settles the historic claims and the breach of te Tiriti o Waitangi/the Treaty of Waitangi and its principles. As part of the cultural redress, statutory acknowledgement was made over an area of CMA including the Manukau Harbour and Waiuku Estuary (as shown in **Figure 2.8**).

The Deed of Settlement Summary states that "A statutory acknowledgement recognises the association between Ngāti Tamaoho and a particular site or area and enhances the iwi's ability to participate in specified Resource Management Act 1991 processes." In particular, the consent

authority "must have regard to every relevant statutory acknowledgement made in accordance with an Act specified in Schedule 11" when determining affected parties.

Ngāti Tamaoho have been consulted with as part of this application process and will continue to be engaged with in an ongoing capacity as discussed at Section 10.

There are also inland areas where Ngāti Tamaoho have statutory acknowledgement, largely in relation to streams and their tributaries. These areas are shown on **Figure 2.8**.

Other statutory acknowledgement areas relevant to the Manukau Harbour and area surrounding the Steel Mill Site include Ngai Tai ki Tamaki (which covers the eastern half of the Manukau Harbour) and Te Kawerau a Maki (which covers the northern portion of the Manukau Harbour).

While these areas are noted in this application for completeness, they lie beyond the influence of potential adverse effects of the discharges to air from the Steel Mill (given their physical distance) and therefore are not considered any further.

9.5.2.2 Marine and Coastal Area (Takutai Moana) Act 2011

Section 62(3) of the MACA requires that, if a person applies for a resource consent in relation to part of the common marine and coastal area, that person must notify any Customary Marine Title (CMT) applicant groups with an interest in that part of the common marine and coastal area and seek the views of those groups.

The proposed air discharges the subject of this application do not discharge directly to the common marine and coastal area. Notwithstanding this, NZ Steel has notified parties in accordance with section 62(3) of the MACA, as there are CMT applications which apply to the coastal area of the Waiuku Estuary that is directly adjacent to the Steel Mill (as set out in Section 10.4).

9.5.3 Other non-statutory documents relevant to the application

9.5.3.1 The Auckland Plan 2050

The Auckland Plan 2050 (AP2050) is a spatial plan that sets the direction for how Auckland will grow and develop over the next 30 years. This plan was recently updated in 2018 to further build on what was done in the 2012 plan. AP2050 recognises that the Auckland region is faced with three key challenges: high population growth, ensuring prosperity is shared amongst all, and arresting and reversing environmental degradation. AP2050 identifies six strategic directions in which we must make significant progress. The issue of degraded air quality spans across all these areas, particularly focussed on a sustainable transport system, using green infrastructure.

Auckland's urbanisation means that emissions from transport, domestic heating (the use of solid fuels such as wood and coal) and industry combine to degrade air quality. However, the latest report on the health of Auckland's natural environment (discussed in 9.5.2.2 below) shows that air quality has improved significantly in the last few decades as a result of effective air quality management.

The 2012 Auckland Plan set a target to reduce PM_{10} discharges across the region by 50%. The Auckland Air Emissions Inventory 2016[79] indicates that the PM_{10} discharges have declined by approximately 34% at a regional level but did not meet the target.

In respect of this application, the replacement of the Steel Mill air discharge permits will ensure that the Steel Mill's contribution to local, regional and national prosperity is continued and NZ Steel will also continue to monitor, manage and improve its practices, in order to minimise PM_{10} emissions.

[79] Crimmins 2018

9.5.3.2 Auckland Council State of the Environment Report 2020

Auckland Council's Research and Evaluation Unit has released its latest State of the Environment (SOE) report – "The health of Tāmaki Makaurau / Auckland's natural environment in 2020". This report is a synthesis of the Council's monitoring and reporting programme. SOE monitoring and reporting generates knowledge to inform Council decisions on where to prioritise responses, actions and funding.

In respect to air quality, it is noted that regional air quality monitoring has occurred consistently since the late 1990s. Data from across the monitoring network is used to assess ambient concentrations of air pollutants for compliance with the NESAQ. Overall, the report concludes that air quality is good and improving including a decreasing long-term trend for PM_{10} and NO_2. Shorter term trends show NO_2 concentrations at roadside sites plateauing or increasing, which coincides with increased traffic levels such that transport emissions continue to be the main source of air pollutants in Auckland, along with residential wood burning and industry.

9.5.3.3 Iwi management plans

An iwi management plan (IMP) is a term commonly applied to a resource management plan prepared by an iwi, iwi authority, rūnanga or hapū.

No publicly available IMPs were able to be sourced for the following iwi:

- Ngāti Te Ata
- Ngāti Tamaoho
- Te Ākitai Waiohua
- Te Ahiwaru - Waiohua
- Ngāti Maru

Ngāti Whātua Orakei have a publicly available IMP however, the area ('rohe') to which it applies does not include the Steel Mill Site or its surrounds (as it is largely focussed north of the Awhitu peninsula).

Waikato Tainui have developed an Environmental Plan and this Plan is applicable to the Steel Mill and its surrounds. Chapter 23 is specific to Te Ararangi – Air. The Environment Plan states that "It is important to Waikato-Tainui that emissions to air are adequately regulated to maintain and improve good air quality. Air is a taonga and is valued for its life supporting capacity. Like water, air was sacred to Waikato-Tainui tuupuna with its quality affecting our environment, health, cultural lifestyle, and standard of living." This is reflected by Objective 23.3.1 of the plan that seeks that the quality and amenity of discharge to air is such that the life supporting capacity and quality of air within the rohe is retained at a level that does not compromise human health, amenity values, or property.

9.5.3.4 Good Practice Guide to Assessing and Managing Dust 2016

The Good Practice Guide to Assessing and Managing Dust is a guide provided by the Ministry for the Environment that provides information on how to assess and manage dust emissions from particular sources and activities such as those that occur on the Site. It is part of a series of good practice guides for air quality which together help provide comprehensive and consistent management of air quality in New Zealand. The guide has been considered as part of the AQA at **Appendix F**.

9.5.3.5 Good Practice Guide for Assessing Discharges to Air from Industry 2016

Good Practice Guide for Assessing Discharges to Air from Industry 2016 is another part of the series of good practice guides released by the Ministry for the Environment. This guide outlines good

practice recommendations for assessing air quality in New Zealand, mainly for the purpose of resource consent applications. It provides a practical and reasonable approach to managing discharges to air from industry. The guide has been considered as part of the AQA at **Appendix F**.

9.5.3.6 World Health Organisation Air Quality Guidelines 2005

The primary aim of the World Health Organisation (WHO) Air Quality Guidelines Global Update 2005 (WHO 2006) (WHO guidelines) is to provide a uniform basis for protecting public health from the effects of air pollution in response to the increasing evidence of the health impact of air pollution. They are intended for worldwide use. The WHO revised its existing air quality guidelines for Europe in October 2006 and expanded them to produce the first global air quality guidelines.

The WHO guidelines are based on the latest scientific evidence and set targets for air quality to protect the large majority of individuals from the effects of air pollution on health. These include annual guidelines for $PM_{2.5}$ and for SO_2, which are not currently covered by New Zealand standards or guidelines.

The current NESAQ only targets PM_{10}, but as discussed at Section 9.3.1 the proposed amendments to the NESAQ seek to align with this WHO guideline. The AQA has assessed the Steel Mill performance against the WHO guidelines proposed for adoption and there have been no exceedances of the 24-hour average or annual average proposed ambient air quality standards over the monitoring period.

The WHO 24-hour guideline for SO_2 is considerably more stringent than the New Zealand ambient air quality guideline. The 24-hour WHO guideline is set at a concentration of 20 µg/m³, which is substantially lower than the New Zealand AAQG of 120 µg/m³ (the previous WHO guideline value). This matter has been extensively investigated in the regional planning process for Auckland Council in relation to the AUP, which subsequently did not seek to adopt the WHO 24-hour average SO_2 guideline.

The data shows that there were no exceedances of the NESAQ or NZ AAQG values over the monitoring period at any of the monitored sites. However, there were occasional exceedances of the 24-hour average WHO guideline value for SO_2 at the 64 Glenbrook Beach Road (Site 20) monitoring site.

9.5.3.7 Minamata Convention on Mercury

The Minamata Convention on Mercury was concluded in 2013 and entered into force in New Zealand on 16 August 2017. It is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

As discussed at Section 9.3.1.1, amendments are proposed to the NESAQ to provide for the requirements of the convention however, none of the amendments are relevant to the Steel Mill or this application.

10 Consultation and communication

10.1 Introduction

Consultation and communication regarding this replacement resource consent application has been undertaken with a number of stakeholders and interest groups, including Mana Whenua, adjacent landowners and utility operators. As part of its longstanding connection to the local community NZ Steel will continue to engage with stakeholders following lodgement of this AEE. This section provides an overview of the consultation activity that has occurred to date and indicates where this is likely to continue to occur throughout the duration of the consenting process.

10.2 NZ Steel Environment Committee

NZ Steel has an established engagement process through its Environment Committee, which has existed since the 1970s. The Committee meets three times per year and comprises representatives from a number of external parties including:

- Franklin Local Board;
- Auckland Council compliance team;
- Auckland Regional Public Health;
- Mana Whenua (Ngāti Tamaoho and Ngāti Te Ata);
- Federated Farmers; and
- Glenbrook Irrigation Co Limited.

These meetings provide a platform for NZ Steel and representatives to discuss a range of matters concerning the Steel Mill including day-to-day business, compliance and monitoring as well as provide representatives with an opportunity to pose queries and give feedback.

When representatives are unable to attend meetings, minutes of the meeting and copies of presentations are provided to representatives for their information.

At the July 2020 meeting, Claire Jewell (NZ Steel's Environment Manager) presented an initial briefing on the replacement resource consent application. The attendees were provided with an overview of the Steel Mill processes, the indicative programme including anticipated lodgement dates, an overview of the technical studies being undertaken and an overview of the stakeholder actions to be undertaken. The attendees were also advised of the briefing held between NZ Steel and Auckland Council that occurred in June (discussed below in Section 10.5). Meeting attendees had no comments or questions in response to this initial briefing.

At the November 2020 meeting, Ms Jewell presented a summary of activities to date of key aspects of the technical assessments, terrestrial and marine vegetation, freshwater ecological survey and a summary of key findings relating to discharges to air. An update on the NZ Steel external website and information on the replacement consent time frame was provided.

In March 2021, the most recent meeting held prior to lodgement of this application, further summary information was provided of the technical discharges to air key findings. The results of the air modelling were discussed and highlighted that the main focus area for assessment and mitigation was in relation to fugitive emissions by showing weekly and seasonal variation of PM_{10} and other boundary monitoring results comparisons. Activities being undertaken to mitigate some of these effects were discussed as key improvements. Further information on time frames and the separate lodgement of applications for the Steel Mill's air and water discharge replacement consents was also given at the meeting.

Copies of the July 2020, November 2020 and March 2021 Environment Committee meeting minutes are contained at **Appendix J**.

10.3 Community

The local community, including surrounding neighbours, the general public and internal stakeholders are anticipated to be interested in the ongoing environmental effects of the Steel Mill. Consultation undertaken so far with these groups is outlined below.

10.3.1 Surrounding rural neighbours

NZ Steel commenced consultation on the resource consent replacement process with surrounding rural neighbours in December 2020. The nearest landowners to the Steel Mill were identified and members of NZ Steel's Environment Team, Amy Hill and Debbie Bryson, have initiated contact via letter drop and door knocking. A copy of the stakeholder briefing used for the letter drop and door knocking is contained at **Appendix J**.

As a product of the engagement undertaken to date, a small number of residents on Glenbrook Beach Road raised the following matters relevant to the air discharge replacement consent application:

- Black dust on outdoor furniture, vehicles, buildings; and
- Air borne dust in general.

Traffic impacts and noise from truck movements were also mentioned however these matters are beyond the scope of this application.

Dust effects are discussed in Section 7.3 of this AEE and are discussed in detail in the AQA (**Appendix F**). Mitigation measures proposed to manage these effects are discussed in Section 4.

10.3.2 Transpower

Transpower owns and operates a substation directly adjacent to the Steel Mill. In February 2021 NZ Steel contacted Transpower and lodged a query with their online query portal Patai (Reference PATAI000024). The query is currently in the processing status and no response has been received at the time of lodgement.

10.3.3 BOC Gas

BOC Gas owns and operates an air separation plant adjacent to the Steel Mill (on land owned by NZ Steel), which provides the Steel Mill with gas required for various processes. NZ Steel also provides water and electricity to BOC for the manufacture and supply of BOC products. A meeting was held in March 2021 between representatives of NZ Steel and BOC.

They were interested in understanding the health effects from the air discharges and indicated they would like to be kept up to date with findings and to receive a copy of the lodged resource consent application for discharges to air. A copy of the consultation brief and NZ Steel's Sustainability Snapshot (2020) was provided. NZ Steel will provide the AEE and technical documentation post-lodgement.

10.3.4 Glenbrook School

Glenbrook School is a full primary school (Years 1 to 8) located approximately 1.6 kms to the east of the Steel Mill. Glenbrook School currently has a PM_{10} unit located within its boundary for monitoring of air quality.

NZ Steel representatives contacted Glenbrook School (via school Principal Lysandra Stuart) for consultation on this application. Upon the School's request, NZ Steel provided an information booklet concerning the reconsenting (Consent briefing document). A further meeting was held on 14 October 2021 and included discussion of the assessment findings, the proposed amendments to the monitoring regime and the consenting process. A request for a copy of the AEE was made and this document has been provided to the School.

The School has not raised any specific concerns to date but advised that it would contact NZ Steel if it had any specific matters for discussion.

10.3.5 General public

NZ Steel established a page on its external website specifically for providing brief information regarding the proposed replacement air and water discharge consents. The webpage was initially published in September 2020 with subsequent updates as the Proposal has progressed.

The website also lists contact details for NZ Steel and includes discussion of why the consents are required and what can be expected from the process. The website is located at https://www.nzsteel.co.nz/sustainability/our-environment/environmental-management-and-resource-consents/. The website encourages the community to contact NZ Steel should they have any queries or comments about the consenting process. To date, no queries or comments have been received from the general public.

NZ Steel maintains a complaint register and it is noted that there have been no complaints this year and an average of four complaints have been received each year for the previous six years. While NZ Steel endeavours to have the least impact on residents and takes all complaints seriously, the numbers are relatively low given the scale of the Steel Mill operation.

10.3.6 Glenbrook Beach Residents and Ratepayers Association

A request to present to the Glenbrook Beach Residents and Ratepayers Association arose during an Environment Committee meeting. NZ Steel intended on consulting with the Glenbrook Beach Residents and Ratepayers Association prior to the lodgement of the application, however meetings were delayed due to Covid-19 restrictions. The presentation will be rescheduled post lodgement.

10.3.7 Internal stakeholders

NZ Steel employees and onsite contractors have been kept up to date on the process via a number of internal communication avenues, including updates on the internal staff intranet, quarterly updates on findings to Central Health Safety and Environment Improvement Team Meetings (CHEIST) (similar to what is provided at the Environment Committee meetings) and in quarterly financial briefings given to staff from their Senior Leadership Representative. No feedback from internal stakeholders has been received to date.

10.4 Mana Whenua

A number of iwi groups have mana whenua interests in the area of the Site. These are identified on the Auckland Council Geomaps database as:

- Ngāti Maru
- Ngāti Tamaoho
- Ngāti Te Ata
- Te Awhiwaru – Waiohua
- Te Akitai Waiohua

- Waikato-Tainui

On 11 November 2020, these groups were notified via a letter and email of NZ Steel's intention to seek replacement resource consents for air and water discharges. No responses were received in relation to this initial contact. A follow up email was sent on 14 December 2020 to update the iwi on progress made on the applications. No responses were received to this follow up email. Copies of the communications are provided at **Appendix I**.

As described in Sections 7.8 and 9.1.4, there are application(s) under the MACA which apply to the coastal area of the Waiuku Estuary directly adjacent to the Site. It is a statutory requirement to notify and seek their views on the application prior to lodgement. The relevant parties are:

- Cletus Manu Paul
- Ngāti Kawau
- Te Waiariki Korora
- Ngāti Kawau te Kōtuku
- Te Uri o Te Aho
- Ngāti Kuri
- Te Waiariki Korora nga Hapū o Ngāpuhi-Nui-Tonu
- Ngāti Te Ata
- Ngāti Tamaoho
- Te Whakakitenga o Waikato
- Te Whakakitenga o Waikato Incorporated
- Rihari Dargaville on behalf of the New Zealand Maori Council

These parties were notified of the Proposal and their views sought on 11 November 2020. Copies of the notification material is provided at **Appendix I**.

A response was received from Ngāti Te Ata requesting copies of the relevant technical reports. A copy of this AEE, together with appended technical reports, will be provided to Ngāti Te Ata following lodgement.

Some of the abovementioned iwi have a particularly strong interest in the area and have been consulted further as described below.

10.4.1 Ngāti Te Ata

NZ Steel has a long-standing relationship with Ngāti Te Ata. This is recognised by Ngāti Te Ata's representation on the Environment Committee as discussed at Section 10.2 above.

Hui with Karl Flavell (Environmental Manager) of Ngāti Te Ata have been held in relation to the Proposal on 1 August 2020; 15 and 23 September 2020; 22 December 2020 and 27 January 2021. Mr Flavell provided NZ Steel with a draft Consultation Document on 30 November 2020 which included detail regarding cultural values and related recommendations and aspirations.

The hui discussed matters of importance for Ngāti Te Ata as detailed in the document mentioned above and NZ Steel's response to those matters in the context of the consent application process. This document was updated after these discussions and was approved by Ngāti Te Ata as an appropriate Cultural Values Assessment on 18 March 2021 (copy provided at **Appendix I**).

This document, along with participation of Ngāti Te Ata on the Environment Committee and the multiple hui with Mr Flavell have been used to develop an understanding of matters of importance to Ngāti Te Ata, and to inform the discussion of cultural effects in Section 7 of this AEE.

Ngāti Te Ata have requested that a copy of this application is provided upon lodgement which NZ Steel will provide. Engagement with Ngāti Te Ata will be ongoing.

10.4.2 Ngāti Tamaoho

NZ Steel has a long-standing relationship with Ngāti Tamaoho. This is recognised by Ngāti Tamaoho's representation on the Environment Committee as discussed at Section 10.2 above.

Ngāti Tamaoho has a statutory acknowledgement which includes the CMA area adjacent to the Steel Mill. The statutory acknowledgement recognises the association between Ngāti Tamaoho and the area and enhances the iwi's ability to participate in specified RMA processes.

A hui to discuss progress with the reconsenting was held with Zac Rutherfurd-Sirrett (RMA Officer for Ngāti Tamaoho) on 22 March 2021. A further hui, with both Zac Rutherfurd-Sirrett and Edith Tuapiki during a site visit to the Steel Mill involving Ngāti Tamaoho leadership, was undertaken on 25 March 2021. Attendees of the site visit included Ngāti Tamaoho CEO, Matekino Marshall and other representatives of the iwi. NZ Steel and Ngāti Tamaoho have committed to ongoing meaningful engagement regarding NZ Steel's operations, including in relation to this resource consent application.

Ngāti Tamaoho representatives have provided their approval in principle as well as recommendations in a letter, a copy of which is provided at **Appendix I**.

The letter, hui, and participation of Ngāti Tamaoho on the Environment Committee have been used to develop an understanding of matters of importance to Ngāti Tamaoho and to inform the discussion of cultural effects in Section 5 of this AEE.

Ngāti Tamaoho have requested that a copy of this application is provided upon lodgement which NZ Steel will provide. Engagement with Ngāti Tamaoho will be ongoing.

10.5 Auckland Council

The Site is located wholly within Auckland Council's jurisdiction as a Unitary Authority[80].

An initial briefing meeting was held with team members from Council's Regulatory Team in June 2020. Attendees at this briefing included the Project Lead, and the assigned processing planner, as well as the Council's team of specialists that will be assessing and reporting on the application.

A follow up site visit was held with Council specialists on 1 July 2020. The site visit enabled Council specialists to understand the operations of the Site and to compile a list of questions or matters for the applicant to cover within the application.

Ongoing monthly 'Steering Group' meetings have occurred since September 2020 to provide a forum to report on progress with the applications, any potential risks and issues etc. Attendees at this meeting include the Council's Project Lead and processing planner.

A workshop was held with Council (comprising the assigned Project Lead, processing planner and Council specialists) on 26 January 2021. The intention of the workshop was to provide an opportunity for the Proposal's technical specialist team to present on the work undertaken to date including preliminary findings, and to provide Council the opportunity to provide feedback in advance of lodgement of the applications.

[80] Unitary Authority under the Local Government Act 2002 (LGA), meaning it is a territorial authority that also has the responsibilities, duties, and powers of a regional council.

NZ Steel also has periodic meetings with Auckland Council compliance officers. The most recent compliance visit was held in January 2021. Auckland Council compliance officers are also invited to the Environment Committee meetings (held three times a year).

10.6 Franklin Local Board

Local boards provide governance at the local level within Auckland Council. They enable democratic decision making by, and on behalf of communities within the local board area.

As discussed in Section 10.2 above, elected representatives from the Franklin Local Board area sit on the NZ Steel Environment Committee and have therefore been kept up to date on progress of the replacement resource consent applications through that process.

Site visits have been undertaken in order to familiarise Franklin Local Board representatives with the manufacturing process. No specific feedback has been received in relation to these applications. NZ Steel will continue with engagement post lodgement.

10.7 Department of Conservation

The Department of Conservation (DOC) has a statutory obligation to conserve New Zealand's wildlife. It is interested in effects on marine and terrestrial habitats, flora and fauna, birdlife. In particular, the area to the north in the Waiuku River is a Significant Ecological Area (Marine 2).

DOC was contacted via email on 15 December 2020. In its response on 2 March 2021 and on 10 March 2021 Fiona McKenzie, Senior Ranger (Statutory Land Management), indicated that DOC would like to see the technical documentation and AEE reports. DOC is particularly interested in the marine discharges associated with the water discharge and did not raise any specific matter of relevance to the air discharge application.

NZ Steel will provide DOC with a copy of this application (including the AEE and all technical reports) upon its lodgement.

10.8 Auckland Regional Public Health Service

The Auckland Regional Public Health Service (ARPHS) is responsible for preventing disease and improving the health of the people in the Auckland region and they represent the District Health Boards (DHB) on public health and environmental matters.

The ARPHS is represented on the Environment Committee (by Mr John Whitmore). At this stage, no specific feedback has been received from ARPHS in relation to this application.

10.8.1 Federated Farmers

Federated Farmers is a national rural advocacy organisation. Federated Farmers is represented on the NZ Steel Environment Committee as described in Section 10.2 above in the recognition that the Steel Mill is surrounded by agricultural land. A representative from Federated Farmers was invited to attend the site visit held on 16 October 2020, with other Environment Committee members, however the invitation was declined.

No correspondence from Federated Farmers or discussions at Environment Committee meetings in 2020 have raised matters of concern with respect to this application.

11 Proposed conditions of consent

NZ Steel has proposed a set of draft resource consent conditions. These are included in **Appendix L**. For continuity and ease of implementation the conditions of the existing air discharge permit are largely proposed to apply.

The conditions of the Main Air Permit were developed to manage effects of all air discharges resulting from the Steel Mill operations. It is considered that the conditions of Main Air Permit are comprehensive and robust and have appropriately managed the effects associated with ongoing air discharges from the operation of the Steel Mill to date. Therefore, the conditions of the Main Air Permit have been used as a template for the proposed conditions contained in **Appendix L**. The conditions have been updated to reflect current good practice and to take into account the findings of the assessments undertaken to inform this application.

Appendix L contains detail regarding the proposed conditions, including the changes that are proposed to the conditions of the Main Air Permit. The discussion below contains a summary of the key changes, which are to:

- Reflect current / best practice;
- Reporting simplification;
- Environment committee addition; and
- Key monitoring changes based on assessment (stack and ambient) and trigger levels.

11.1 Reflect current / best practice

The Proposed Conditions at **Appendix L** contain a number of wording, phrasing and general updates to reflect present day best practice, guidance and expression.

The Main Air Permit contains numerous requirements (Existing Conditions 7, 8 and 9) for management of discharges to control noxious, dangerous, objectionable or offensive emissions beyond the boundary of the Site. It is proposed to combine the intent of these conditions into a single condition to avoid repetition as well as update the wording to reflect the recommended condition for managing off-site effects of diffuse dust in the Good Practice Guide for Assessing and Managing Dust.

11.2 Simplification of reporting requirements

The Main Air Permit includes various requirements for ongoing reporting to Council, including reporting of all information required by the conditions every three months and two reports that are required every three years.

Given the long-established and stable nature of the Steel Mill, it is proposed to amend the reporting conditions so that reporting of key parameters and events occurs within a short timeframe (emission testing, exceedances of specified PM_{10} level, significant discharges to air and complaints) and the current mid-long term reporting required by Existing Conditions 40, 41 and 44 is replaced by a five yearly monitoring report prepared by a suitably qualified person. This report would also require identification of procedural or physical improvements undertaken, or recommended, to ensure continual improvement is being recognised and achieved.

It is proposed to make provision within the conditions for Council to require an out-of-cycle monitoring report, in the event of a significant adverse effect on the environment. It will be possible for Council to identify the need for an out-of-cycle report, should one be required, given the short timeframe for reporting of key parameters and events. Further, Council compliance officers receive

regular summaries of this information at Environment Committee meetings which are held three times per annum.

A comparison of the ongoing reporting requirements in the Main Air Permit and the proposed conditions included in **Appendix L** is set out in the table below. Where no related condition exists or is proposed, 'N/A' has been used.

	Main Air Permit – Existing Conditions		**Proposed Conditions**	
No.	**Requirement**	**Timeframe**	**Requirement**	**Timeframe**
23	N/A		Results of emission testing	30 working days
32	Remedial action plan related to a verified exceedance of the trigger level.	Within three months	Verified exceedance	3 working days
			Further investigation report	10 working days
37	Significant increase in discharge	As soon as practicable	Significant increase in discharge	As soon as practicable
39	Complaints	Within 24 hours or as soon as practicable	Complaints	Within 3 working days or as soon as practicable
40	Summary of all information required by the consent	Every three months	N/A	N/A
41	Site major sources of air emissions	Three yearly	N/A	N/A
44	Review of PM_{10} and Nox emissions	Three yearly	N/A	N/A
New	N/A	N/A	Monitoring report	5 yearly
New	N/A	N/A	Reporting to Environment Committee	At least annually

11.3 Addition of Environment Committee requirement

NZ Steel (as discussed at Section 10) has an existing established Environment Committee whose membership includes members of Council's compliance team, the Franklin Local Board, and representatives of Ngāti Tamaoho and Ngāti Te Ata. The Environment Committee meet on a regular basis and are provided a summary of the monitoring data and its analysis, and any complaints received. Conditions are proposed to detail requirements associated with the Environment Committee in the consent to ensure that this process is mandated.

11.4 Changes to monitoring and investigative trigger levels

As described at Section 4.5.3, a number of changes to the existing monitoring requirements are proposed as a result of the findings of the assessment undertaken to support this application. These changes are reflected in the conditions at **Appendix L** and are summarised below.

The changes to the stack testing programme include:

- TSP testing conditions updated to $PM_{2.5}$ for baghouse sources;
- Removal of requirement to test small sources such as the Primary Concentrate Drier Baghouse[81];
- Removal of HCl monitoring conditions at ARP based on stack tests and modelling; and
- Removal of KOBM flarestack as this presents a significant safety hazard for personnel undertaking testing.

The changes to the ambient monitoring programme include:

- Decommission the PM_{10} monitoring site at Sandspit Reserve, as this site has not shown any material influence of emissions from the Steel Mill and does not provide useful information (as it appears to experience abnormal wind conditions);
- Change the monitoring at the Boundary Road site from TSP to PM_{10}, to provide a background site for comparison with the results from the 64 Glenbrook Beach Road site (Site 20);
- Include a requirement for $PM_{2.5}$, as well as PM_{10}, monitoring at 64 Glenbrook Beach Road (Site 20); and
- Decommission the monitoring site at Glenbrook School (Site 17), as all monitoring to date has shown excellent to good performance against all assessment criteria for the protection of human health.

The changes to the ambient monitoring investigation trigger level system are revisions to reflect the current good practice guidelines as follows:

- Update the TSP investigative trigger level from 80 $\mu g/m^3$ to "250 $\mu g/m^3$ as a 1-hour average" as this is the relevant TSP level for moderate sensitivity receiving environments as specified in MfE's Good Practice Guidance; and
- Update the PM_{10} investigation trigger level of 33$\mu g/m^3$ to 50$\mu g/m^3$ as a 24-hour average as this is the relevant PM_{10} level for moderate sensitivity receiving environments as specified in MfE's Good Practice Guidance. The current reference to 33$\mu g/m^3$ is not a relevant effects-based level.

[81] Referred to as the Millscale & iron sand drier (Steelserv) in the existing conditions.

12 Conclusion

This AEE report has been prepared on behalf of NZ Steel to accompany a resource consent application to discharge contaminants to air from the Site. Resource consent is required from the Council as a Discretionary Activity under the AUP.

This AEE report draws the following conclusions:

- Resource consent is sought to authorise the discharge to air from the Steel Mill operations. For the avoidance of doubt, NZ Steel is seeking resource consent under the rules identified in this application and any other air consents necessary to authorise the activities described in the application, even if not specifically noted, including under any future National Environmental Standards;
- The assessment of the environmental effects of the discharge of contaminants to air has concluded that:
  - The discharge would comply with health and ecological assessment criteria for NO_2, NO_x, metals, HCl, Cl_2, VOCs, dioxins and PAHs;
  - Ambient monitoring shows general compliance with the current consent conditions and assessment criteria, however a small number of exceedances of hourly and 24-hourly limits are recorded each year for PM_{10} and occasional exceedances of the 24-hour average WHO guideline value at the 64 Glenbrook Beach Road (Site 20) site for SO_2. The actual and potential health effects of these exceedances have been assessed by an independent public health expert and the health effects of both SO_2 and PM_{10} are considered to be less than minor overall. For those sporadic infrequent days where the PM_{10} concentrations are greater than the NES 24-hour values, the effects are considered to be minor;
  - The trending increase in TSP and PM_{10} levels is attributed to fugitive emissions from the Steel Mill, namely raw material handling and stockpiling, material recovery processes and the use of the Site's internal roading network. A number of improvements and mitigations have recently been implemented, or are proposed to be implemented, to further manage these fugitive sources. The ongoing management of contaminants in conjunction with a robust monitoring regime will ensure that potential health and nuisance effects are able to managed appropriately;
  - Effects of the air discharges on ecology comprising those on sensitive terrestrial vegetation, aquatic environments (through aerial deposition) and local horticulture are minimal;
  - Effects of the air discharges associated with landscape, visual amenity and natural character are viewed within the context of the existing industrial Site and are considered to be less than minor;
  - Cultural effects have been taken into consideration and through the ongoing involvement of Ngāti Te Ata and Ngāti Tamaoho on the Environment Committee, any adverse effects on cultural values will continue to be managed;
  - Cumulative effects have been addressed as the ambient monitoring provides data from all sources. The assessment of effects contained above is largely based on the monitoring data combined with the anticipated contaminant contributions of the generators where appropriate and therefore represents a conservative assessment of effects. Background contaminant levels have been provided for context.
- There is no impediment to granting of consent for the discharge under Regulations 20 or 21 of the NESAQ as there were no recorded (or predicted) exceedances of the NESAQ or AAQG values for SO_2, NO_2 and CO, nor is there an impediment to granting resource consent under

Regulation 17 as the airshed within which the Steel Mill is located does not meet the definition of "polluted";

- The ongoing operation of the Steel Mill, including its discharges to air, result in significant positive effects on the local, regional and national economy through provision of steel resources, employment and contribution to GDP. The value of the investment of NZ Steel as the existing consent holder is significant on any measure. Information on the value of the investment has been provided in accordance with 104(2A);
- The discharges are consistent with the relevant objectives and policies of the NZCPS, NPSFM, NPSUD and the AUP; and
- The discharges are consistent with Part 2 of the RMA.

NZ Steel requests that this resource consent application is publicly notified. In accordance with section 95A(2)(a) and 95A(3)(a), public notification is therefore mandatory.

The suite of draft conditions proposed by NZ Steel is included in **Appendix L**.

Until such time as this application is determined and any appeals on this application are resolved, the Steel Mill will continue to operate in accordance with the terms of the Existing Consents pursuant to section 124.

13 Applicability

This report has been prepared for the exclusive use of our client New Zealand Steel with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

We understand and agree that this report will be used by Auckland Council in undertaking its regulatory functions in connection with the applications for replacement resource consents.

Tonkin & Taylor Ltd

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18-Oct-21

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