Environmental Effect Assessment for Large Gold Dredge/Screen Mining Operations

Information Required in Support of an Application Under
Section 59 of the Crown Minerals Act for an Access Arrangement
to Conduct Mining Pursuant to Section 61 of that Act.

July 2011 version

Contents

1 Initial Assessment

1.1 Introduction

This environmental assessment shall be used to determine the existing natural and historic values of the land / area detailed in the applicant's dredge mining proposal. It provides the Department of Conservation ("the Department") with a means of assessing the impact of the operation on the natural environment, and enables the applicant to show how they intend to mitigate such effects. The Department shall use this assessment as the basis of the imposition of a number of obligatory minimum operating conditions.

It is essential that all applicants discuss the nature of their proposals with the Department prior to submitting their application.

A full and comprehensive level of detail is required. It is advised that all applications be backed up with documents containing supporting evidence, such as drawings, maps, plans, programme of works and project overview. If the Department has to request additional information, the application will be delayed. It is imperative that the application be completed by someone such as a technical consultant who is familiar with all aspects of the area in question, the methodology to be employed during operations, likely environmental impacts and mitigating measures that can be employed to minimise such effects.

1.2 Relevant Legislation

Sections 54, 59, 60 and 61 of the Crown Minerals Act (1991) cover the issue of right of access. The Act requires that both a permit and an access arrangement are needed before any prospecting, exploration or mining activities can take place in respect of Crown owned minerals.

1.2.1 Section 54

54: Access to land for minerals other than petroleum

(1) This section shall not apply to minimum impact activities.

(2) The holder of a permit in respect of a mineral (other than petroleum) shall not prospect, explore, or mine in land to which his or her permit relates otherwise than in accordance with an access arrangement—

(a) agreed in writing between the permit holder and each owner and occupier of the land; or
(b) determined by an arbitrator in accordance with this Act.

(3) Subsection (2) does not apply if the permit relates to land in the common marine and coastal area, but if the permit relates to land described in Schedule 4, the permit holder may exercise the permit only—

(a) in respect of land that is not subject to a customary marine title order or agreement; and
(b) in accordance with an access agreement agreed in writing between the permit holder and the appropriate Minister.

1.2.2 Section 59

59: Notice of request for grant of right of access.

(1) Every person wishing to obtain an access arrangement in order to explore, prospect or mine on or in land shall serve on each owner and occupier of the relevant land, a notice in writing of that person's intention to obtain an access arrangement.

(2) Every notice under subsection (1) shall, in addition to matters required by regulations, specify:

a) The land affected; and
b) The purpose for which the access arrangement is required; and
c) The proposed programme of work including the type and duration of work to be carried out and the likely adverse effect on the land or the owner or occupier of the land; and
d) The compensation and safeguards against any likely adverse effects proposed; and
e) The type of permit held or applied by the person giving the notice.

(3) Where an access arrangement is obtained by agreement and the requirements of this section were not complied with in a material way, then such agreement shall be of no force or effect unless the non-compliance is waived in writing by the owner or occupier affected.

Applicants should note that the above section requires notice to be served on **every occupier** of the Department's land to which the application refers. Contact details for relevant occupiers may be obtained from Conservancy offices.

1.2.3 Section 60

That section sets out the provisions under which an access arrangement may be granted. It covers the following:

a) Periods of access
b) Regions of interest
c) Types of works
d) Imposition of conditions
e) Environmental protection
f) Compensation to be paid to the land owner / occupier
g) Dispute resolution
h) Manner of varying the agreement

1.2.3 Section 61

The section allows an appropriate Minister to enter into an access arrangement for Crown land administered by the Department. The Minister must have regard to certain specified factors in so deciding.

Specifically, applicants' attention is drawn to part 2(d), which instructs the Minister to consider "The safeguards against any potential adverse effects of carrying out the proposed programme of work;"

Under Section 61A a person may **not** prospect, explore or mine in Crown land for a mineral that is not the property of the Crown, except where an access arrangement may be entered into by an appropriate Minister under Section 61B. An access arrangement is not required where the owner of the mineral has the right to exclusive occupation of Crown land in a coastal marine area.

1.3 Costs

Five tiers of costs apply to those wishing to lodge an application to mine:

(1) Initial application fee.
(2) Additional information / processing costs – charged in the event that documentation tendered by the applicant proves insufficient to enable further processing.
(3) Ordinary processing costs.
(4) Ongoing monitoring costs.
(5) Compensation for land use.

Compensation as prescribed under section 76 of the Crown Minerals Act (1991), is payment made to the Department by the applicant to offset the result of the applicant's activities or operations on its land. It

can be asked due to injurious affection, loss or damage suffered or likely to be suffered, reimbursement for lost revenue and a loss in values.

Compensation may take the form of cash payment to a Conservancy trust fund for conservation purposes, or be a transfer or exchange of land with similar and different or comparable values or provision of services to the Department or some other form to be agreed.

The form and amount of compensation must be proposed by the applicant and may be accepted directly or after negotiations. The Department shall advise whether the applicant's offer is acceptable. No access arrangement may be entered into prior to compensation being agreed.

1.4 Definition of the Application Area

The applicant must provide the following in order to accurately delimit and illustrate the area of interest:

- A topographical map showing the location of the area with relation to neighbouring properties and regions
- A certified land status schedule obtained from Land Information New Zealand, together with a legal description
- A detailed map, plan, drawing or aerial photograph of the application area showing topography, water courses, physical features, vegetation, land use, rights of way and any special features
- A series of photographs showing the application area from a number of representative viewpoints.

1.5 Duration and Consents

State the number of years for which the access arrangement is required.

Outline any resource consents sought or obtained in relation to the proposal.

2 Existing Natural Environment

2.1 Landscape

Provide a detailed description of the topography of the zone of interest and surrounding area. Show all major physical features, relief, water courses and bodies of water. Clearly show on a plan of the area all different landforms present. Make an assessment of approximate percentages of the different types; i.e.: 20 % braided river bed, 5 % scree, 40 % open mountainside above tree line etc.

- Include a broad assessment of geology and soil types and drainage patterns
- Give a description of seasonal weather patterns, particularly: historical levels of precipitation and both mean and extremes of summer and winter temperatures

2.2 Nature Conservation Values and Biodiversity

2.2.1 Floral Assessment

Give a description of the major types of vegetation found in, and adjacent to, the application area. Depict the variation on a map of the site.

Each vegetation unit should be annotated as follows:

- Approximate area.
- Name of predominant species
- Any previous use within area
- Extent, if any, of modification of area
- Any known endangered species present
- Known presence of a species at the edge of their natural range

2.2.2 Faunal Assessment

Provide a list of wild animals present in, and adjacent to, the application area. This should include:

- Bird species and number observed
- Known native fish, invertebrate species and other aquatic fauna in any waterways
- Known presence of endangered species
- Known breeding / spawning ground for any species

2.2.3 Habitat Assessment

Give a broad outline of the key habitat characteristics present within the application area:

- Is the area part of a larger natural environment or does it form an isolated pocket within a modified landscape
- Provide an indication of the extent to which introduced species are present
- Show the presence and extent of any natural waterways, wetlands, dune systems or tidal estuaries
- Indicate whether the application area is currently, or has been, the subject of scientific or ecological study with relation to bio-diversity and natural habitat

3 Archaeological and Historic Sites

If there are any sites of historical and archaeological interest within the application area an archaeological assessment from a qualified archaeologist will be required. In some cases an archaeological survey may be required to determine whether there are any historic sites in the area. In cases where historic sites are identified, outline measures to be undertaken to avoid or mitigate disturbance of such sites.

4 Social Environment

4.1 Existing Landscape and Scenic Qualities

Describe in detail the landscape of the area, with particular reference to the following:

- Historical modification of the existing natural environment
- Proximity of proposed activity to roads, tracks, pathways and routes

4.2 Noise Considerations

If machinery is to be used as part of the applicant's operations, describe the following:

- Existing noise levels
- The source(s) of any noise
- Frequency and duration of any existing noise

4.3 Use of the Area by Visitors

Provide details of existing land use by visiting members of the public, both as private individuals and as part of commercial tourist activities. In particular:

- List all existing recreational amenities in the area covered by the application, such as huts, tracks, bridges, car parks and picnic sites.
- Detail all recreational activities undertaken within, and adjacent to, the application area. These should include tramping, hunting, fishing etc. and any recreational or tourist businesses such as guiding, transport or accommodation.

5 Tangata Whenua

It is necessary for the applicant to consult with the local Iwi. Please show evidence of this consultation and details of its outcome.

5.1 Maori Interest

Give details of any Maori interest in the land or water within, or adjacent to, the application area, particularly:

- Any known sacred or spiritual sites
- Sites of historical occupancy, Pa etc.
- Traditional food gathering areas etc.

5.2 Water

If the application is likely to compromise any Maori interest in the water contained in the application area a full and detailed description of all effects and mitigating measures is required. Details of consultation with local Iwi is also necessary. (See section 6.8). A description of the different states of water follows, to aid provision of an accurate answer to the above.

In Maori belief, the five states of water are listed below:

- **Wairoa** – The purest form of water, Wairoa is used in sacred rituals to purify and sanctify. The rain is Wairoa. It remains pure only while contact with humans is protected by appropriate ritual prayers. At particular sacred sites the sanctity of the prayers and the purity of the water reinforce each other, but if one is damaged, the other is also.
- **Waimaori** – This is the catergory of water after it has come into unprotected contact with humans. It has become ordinary without any particular sacred associations. It is clear, clean water which runs freely. Its generally benevolent Mauri is still present and may be controlled by ritual.
- **Waikino** – This water has been spiritually polluted and can be harmful. It may hide boulders which may cause damage. The Mauri has been altered so that its contained supernatural forces have become non-selective and may cause harm to anyone.
- **Waimate** – Water which has lost its Mauri or life force and is considered spiritually dead. It has the potential to cause damage to people, their freshwater food sources and agriculture.
- **Waitai** – The sea, surf and tide. The saline end product of all the above states, from here the water is purified to fall again as Wairoa.

6 Proposed Operations – Dredge Gold Mining

6.1 Access

6.1.1 Proposals

Describe fully and illustrate on a site plan, all types of access required for personnel, plant, equipment and materials to and from the application area, including:

- Any haulage roads existing or to be constructed.
- Existing and proposed culverts or bridges.
- Any tunnels, cuttings, embankments or significant batters.
- Overhead gantries, pylons or aerial cableways.
- Flume channels or pipelines.
- Helicopter landing pads.
- Personnel tracks and pathways.

Indicate what type of vehicles and transport systems will be employed, frequency of operation and state whether the access requirements are 24 hour, all weather or on a more infrequent or weather dependent basis.

Show detailed proposals for construction of the above or upgrading of existing facilities and indicate what type and size of plant is to be used during such work.

6.1.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.2 Services

6.2.1 Proposals

List in detail and illustrate on a site plan all services present in the area and all proposed services that will be installed for the dredging operation. These may include:

- Power lines. State voltage and means of support, width of access corridor etc. If power is to be generated on site, state size and type of generators, and show their proposed location on a site plan.
- Water mains. State pressure, source and size. Indicate depth of burial or means of support if above ground. See also separate section on water management.
- Compressed air. Show site of compressors and route and size of all lines. Indicate working pressure.
- Aerial masts and towers for any RF communications etc.

In all cases, show how it is proposed to install the services and by whom they shall be installed. Indicate means of plant access to install power poles / dig trenches etc.

6.2.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.3 Site Preparation (non river applications only)

6.3.1 Proposals

Detail topsoil and sub soil depth in the area around the dredge pit and any other area to be affected by building or stripping works.

- Assess the volume (m^3) to be stripped and stockpiled. If the dredge is to be worked in a pit, show where the entire volume of overburden can be stored.
- Indicate the disposal method for native timber felled during the stripping process.
- Show stockpile locations, volumes (m^3) and stabilisation methods.
- Detail method of stripping and subsequent reinstatement. For both open flooded pit and strip type operations, indicate the elapsed period between initial overburden removal and reinstatement.

6.3.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.4 Accommodation

6.4.1 Proposals

If temporary or semi-permanent work camps are to be established for any stage of the proposed work, state size, location, duration of occupation and the number of people occupying any such accommodation facility. Detail any other amenities and facilities to be constructed as part of any work camp. In particular, describe the proposed means of dealing with sewage, foul water and refuse from the camp(s).

Show the positions of the above on a site plan.

6.4.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.5 Surface Structures

6.5.1 Proposals

On a site plan, clearly indicate the proposed extents and number of any temporary or semi-permanent offices, workshops or other buildings. For each structure, show:

- Size and type
- Nature of intended use
- Proposed duration of existence
- Services required within (power, phone, water etc.)

The above should include all processing and washing plants, maintenance shops and welfare facilities. Preliminary design details should be available for all structures for which an engineering design is likely to be required. Included with the proposal should be:

- Types, number and size of any footings and foundations required.
- Construction details and methods, including relevant plant and equipment specifications.
- Service requirements for each structure (water, power etc.)
- Details of vehicle parking and hard standing areas.
- Extents of concrete aprons between structures.
- Areal extents and depths of any settlement or washing ponds (see section on Water Management)

6.5.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.6 Pits and Stockpiles

6.6.1 Proposals

On a site plan, clearly show where it is intended to situate the pit(s) and points of access for plant and personnel.

Show also all surface stockpile areas for strippings. Give volumes of throughput (m^3 per week / tonnes per week etc.). Detail how the stockpiles are to be contained, drained and stabilised, and show their maximum heights and areal extents.

6.6.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.7 Dredging Method

6.7.1 Proposals

Give full description and details of the proposed method for winning gold in the dredging situation:

- General method: fed by excavator, self feeding bucket chain etc.
- Location: in-stream or artificial pit.
- Machinery: type, size, capacity, use and power source.
- Shift sizes, work hours, expected output per week.
- Surface lighting methods and extents.
- Transportation method for men and materials.
- Handling methods.
- Use of chemicals and other potentially hazardous materials, their type, nature, storage proposals, quantities and safeguards to avoid / mitigate spillages.
- Diesel plant, storage and transportation of diesel fuel, emission control etc.
- Overburden: type and expected quantities, disposal / storage methods.
- Any use of explosives: type, quantity per round, purpose and frequency of blasting, expected limits on air overpressure and vibration from each round, storage and licensing requirements, qualified personnel, safety procedures etc.

6.7.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.8 Water Management

6.8.1 Proposals

6.8.1.1 Existing Hydraulic Environment

Detail all impacts on natural water courses and bodies due to the implementation of the proposal. Show any diversions, bunds, stopbanks etc to be constructed to prevent compromise of the natural aquatic environment. Detail all site surface drainage and show how this is prevented from entering natural water courses directly without treatment.

6.8.1.2 Water Supply

Give full details of the following:

- Quantity required.
- Type i.e.: potable or 'grey'
- Source i.e.: municipal main, reservoir, creek, borehole etc.
- Effects of removing water on the source, especially during low flow or drought conditions.
- Effects of installing equipment in watercourses.
- Effects of the above on other water users. Detail whom.
- Type and size of any pumping equipment.
- Any impoundment structures to be constructed.
- Any disturbance which may be caused to the banks or bed of the watercourse.

6.8.1.3 Water Use

Describe the use of water with regard to the proposal. In particular detail:

- Uses in the dredging operation itself and elsewhere.
- Any methods of recycling.
- Contamination details, i.e.: silt, clay, sand, other particulates, chemicals, pH, heat, discolouration.
- Methods to be used to prevent contaminated and clean water being mixed.
- Details of remediation and treatment of water, such as settlement ponds / tanks, chemical admixtures, flocculants, on-land disposal.

Detail how periodic processes such as sump cleaning and desilting shall be dealt with in regard to water management and cleanliness. Procedures should be in place to prevent such activities creating an unacceptable sediment load in the discharged water.

6.8.1.4 Water Disposal

Detail the proposals for efficient and harmless discharge of water from the site. Show:

- Volumes (litres per sec. etc.)
- Frequency.
- Duration.
- Quality, pH, levels of suspended solids etc.
- Effects of addition to existing water courses.
- Contingencies in the event of freezing, delivery pipe blockage etc.
- How sewage from accommodation units, offices etc is to be dealt with.

6.8.1.5 Maori Interests (See section 5.2)

If the use of water in the proposal affects in any way the interests of Maori, detail procedures and / or agreements and negotiations entered into in order to mitigate these effects.

6.8.1.6 River Use

Where the dredge operation is to be carried out directly in a river or other natural body of water (as opposed to an artificial pit), detail the following:

- The methods to be used for construction / delivery of the dredge unit to site.
- Mooring / movement methods.
- Anchoring procedures and position control.
- Emergency flood contingencies.
- Feed method.
- Founding considerations for any heavy riverside plant.
- Discharge of spoil to the river.
- Water uptake.
- Power supply.

6.8.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant’s proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

6.9 Waste Processing

6.9.1 Proposals

Describe in detail the provisions for waste management, both for bulk rock and general rubbish, in terms of both on and off site disposal. Include:

- Transport arrangements.
- Disposal locations.
- Frequency of movements.

6.9.2 Likely Adverse Effects, Safeguards and Mitigation Measures.

Describe with relation to the above, possible adverse environmental effects that could arise as a result of the applicant's proposal. Indicate what safeguards are to be put in place and what measures will be taken in order to mitigate any such effects.

7 Disturbance of Existing Environments

7.1 Effects

With reference to the proposed operations, describe any additional potential adverse or positive effects which the proposed operations outlined in section 6 may have on natural, historic and cultural resources, and on recreational activities as detailed previously in sections 3 - 5.

The above must specifically indicate whether the proposal is likely to cause any of the following:

- Noise: State levels, frequencies, duration etc.
- Increased fire risk.
- Introduction of noxious weeds.
- Visual intrusion.
- Dust and airborne pollution.
- Degeneration of vegetation

In each case, describe safeguards which will be put in place and what measures will be taken in order to mitigate any such effects.

7.2 Monitoring of Effects

Outline in detail what measures shall be adopted to instigate an on-going monitoring system to:

a) Identify conservation values

and

b) Ensure that an effective response can be implemented to mitigate any detrimental change in the above values.

In particular describe which parameters the applicant intends to monitor and for each type, detail the monitoring scheme's:

- Location.
- Frequency.
- Reporting body.
- Relevant governing legislation and acceptable limits.
- Method of analysis.
- Any consultants employed and for what purpose.

The above should include (as a minimum):

- Discharge water turbidity, suspended solids and pH.
- Dust levels around the operation.
- Floral and faunal impacts.
- Fish numbers.
- Noise levels.
- Blasting vibration and overpressures.

8 Reinstatement and Rehabilitation

Detail all proposals for rehabilitation and reinstatement of the entire affected area upon cessation of dredging activity. In particular:

- Show how reinstatement shall be carried out, and how environmental considerations are to be dealt with **during** the reinstatement works.
- If the pit is to be left open and not filled in completely, detail proposals for its final end use.
- Show where any additional topsoil is to be obtained from if stockpiled quantities prove to be insufficient.
- Detail how existing vegetation is to be regrown in the reinstatement area.
- Show how any affected watercourses are to be returned to their natural routes.
- Describe what if any of the dredge infrastructure is to be left and for what purpose. In particular, give details of roadways and access routes which may be left open.
- Detail proposals for water containment, drainage and monitoring beyond the life of the dredging operation.