MWH

BUILDING A BETTER WORLD

REPORT

Proposed Gravel Extraction and Cleanfill Operation

Effects on Water Resources

Prepared for Wairarapa Aggregates Ltd

JULY 2009

WAIRARAPA AGGREGATES LTD

Kiwi Lumber Proposed Quarry Site, Masterton Quarry Management Plan

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1 Introduction

1.1 General Background to the Quarry Management Plan

MWH New Zealand Limited has developed this Quarry Management Plan (QMP) on behalf of Wairarapa Aggregates Limited for its proposed quarry at the Kiwi Lumber site in Waingawa, near Masterton. The QMP is intended to operate in conjunction with any resource consent conditions and to thus contribute to ensuring that potential environmental effects associated with quarrying at the site are appropriately managed and controlled. Wairarapa Aggregates will operate the Kiwi Lumber Quarry site in accordance with this management plan. The QMP will be reviewed every five years by Wairarapa Aggregates.

The QMP covers the significance of the Radio New Zealand mast and sub-surface structure, a summary of information regarding the water take agreement with Carterton District Council and a site specific Erosion and Sediment Control Plan. This QMP updates the previous version dated May 2008 by providing additional detail on erosion and sediment control measures.

1.2 Objectives of the Quarry Management Plan

The purpose of this QMP is to help achieve the following:

1. To ensure the efficient, effective and safe extraction of gravel and sand;
2. To ensure that the operation of the quarry is not a source of nuisance to adjoining landowners;
3. To manage and control any environmental effects resulting from the quarrying activities;
4. To ensure that the site is rehabilitated according to the agreed end-use objectives;
5. To ensure good communication between the quarry operator, the land owner and joint venture party, adjoining landowners, the Carterton District Council and the Greater Wellington Regional Council.

1.3 Site Details and Background to Proposed Quarry

1.3.1 Location

The proposed Kiwi Lumber Quarry site is located immediately to the north of the active Kiwi Lumber site at Waingawa, which is adjacent to State Highway 2. It is approximately 6 km WSW of Masterton, 1.6 km SW of the Waingawa River and 1.2 km N of State Highway 2. The NZ Grid Reference for the site is 2727665E, 6023465N. The site is located entirely within Carterton District. The location of the site is shown in Figure 1.

Note: The disused freezing works adjacent to the site and 150m to 300m away from the proposed quarry site has now been demolished. Figure 2 shows an aerial photograph of the proposed Kiwi Lumber Quarry site.

Figure 1: Location of Proposed Kiwi Lumber Quarry Site

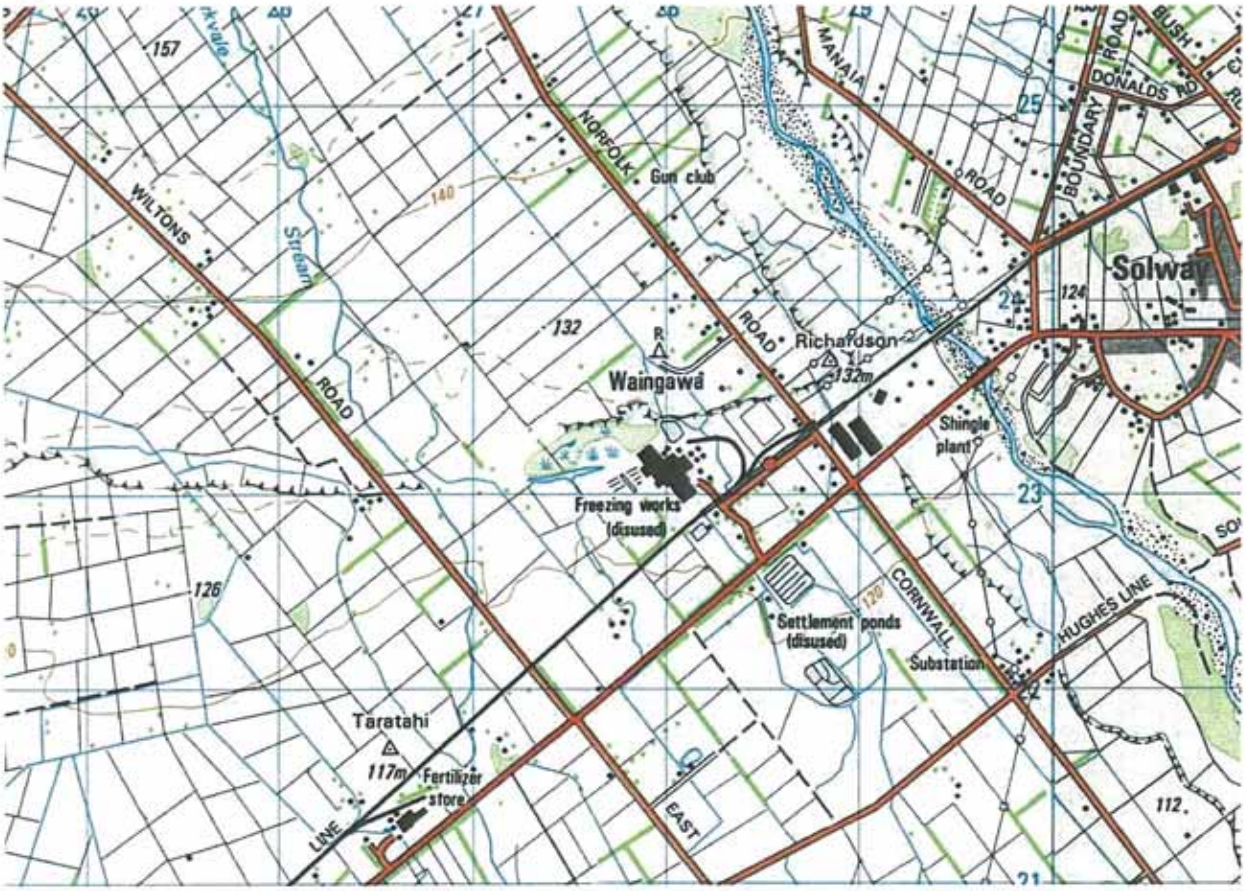


Figure 2: Aerial Photograph of Proposed Kiwi Lumber Quarry Site (taken from the current Google Maps aerial photography)

1.3.2 History and Ownership

The proposed quarry site is located on land owned by Kiwi Lumber (Masterton) Limited (Kiwi Lumber). Wairarapa Aggregates has signed a Profit a Prendre with Kiwi Lumber to extract and utilise the sand and gravel resources at the site for a minimum period of 7 years. The area to be utilised is largely undisturbed pasture, though approximately 10% of the site is occupied by an existing disused quarry excavation. There is also a small area of clean fill within this quarry excavation, which has a maximum depth of 4 metres. Visual inspections of the fill indicate it is comprised of bricks, wood and gravel, in which no possible contaminants were identified, and therefore can be considered as 'clean'. Three small topsoil mounds are located on the site from pre-stripping of the excavation.

Immediately along the south eastern boundary is the active Kiwi Lumber site, which mostly consists of a stocking area for timber and areas of fill or waste wood, pallets, etc. Prior to Kiwi Lumber obtaining this site it was the site of a freezing works (as shown in Figure 1), which has now been demolished. Some materials from demolition of the works have been tipped around the site, in particular along the eastern section of the south eastern boundary of the proposed extraction site (see Figure 2). It is not known what is within this tip. The proposed extraction site is specifically located outside any previous areas of fill, apart from the clean fill located within the existing excavation.

1.3.3 Site Layout

The current layout of the site is shown on the plans in Appendix B, based on a survey carried out in November 2007 by MWH. The site covers an area of approximately 11.6 hectares, with 9.2 hectares proposed for quarry extraction. The proposed extraction area is approximately 700 metres long from SW to NE, with a maximum width of 290 metres from the entrance gate in the middle of the south eastern boundary to the north western boundary. The majority of the natural ground of the site slopes gently from a level of 130m above sea level in the NE to 122m in the SW. The only significant natural topographic feature is a 3m high ridge that runs approximately East-West across the western end of the site, where a splay off the Masterton Fault has lowered the ground level in this area (see Figure 2).

The Masterton Fault that runs across this site is identified in the New Zealand Geopreservation Inventory with a C3 rating. A C3 rating recognises the feature as a regionally important feature which is vulnerable to significant modifications by human actions. It is not anticipated to extract into the feature itself, as located from it to the QE2 covenanted site is material that is not economically viable to extract. To the South of this ridge the natural ground surface becomes very flat and develops into an oval shaped, heavily vegetated wetland, which is a Queen Elizabeth II National Trust (QE2) covenanted area (Figure 2).

The south western and north western boundaries of the site are marked by fences and are adjacent to similar flat pasture that covers the proposed extraction area. The north eastern boundary runs adjacent to a water race that brings water from the Tararua Hills in the NW, and there is also a radio mast along this boundary, which is approximately 50m high. The radio mast is owned and operated by Radio New Zealand, and has a underground, circular copper mat of earth wires of radius 100m from the mast as part of the structure. The copper mat is unable to be modified or moved, therefore has been excluded from the extraction area. The race is approximately 2.5m wide and 0.25m deep and flow is controlled further upstream.

The south eastern boundary runs along old fill from the demolition of the freezing works for the first 150m, and then for 250m along natural ground formed by the excavation and access ramp into the old excavation area. The most western 220m of the south eastern boundary runs adjacent to the QE2 wetland area, which is surrounded by a fence but also has a 5m wide ditch on the proposed extraction area side of the fence, as shown in Figure 3.

Figure 3: Fault Line Boundary to the Proposed Extraction Area - Looking West

The photo (Figure 3) above shows high ground to the right which is within the proposed quarry extraction area. The slope is the fault trace and is beyond the extent of the proposed extraction limit. The land to the left in the photo is below 124m elevation and will not be part of the quarry.

The old excavation is approximately 4m deep and occupies the central part of the site, as shown on the plan in Appendix B. An access gate to the excavation is located in approximately the middle of the south eastern boundary, and a 4 to 5m wide road runs west from the gate down to the quarry floor. The main excavation area has dimensions of approximately 100m by 150m and comprises a flat quarry floor formed in natural ground at approximately the 124m elevation, with two 4 to 5m high gravel stockpiles situated along the eastern face. There is also a small (60m x 70m x 4m) tip in the southwest corner of the excavation, which appears to constitute "clean" fill, comprising bricks, earth and general rubble. There is no indication that the tip contains any potential contaminants, though the surface has been grassed over. The excavation slopes have been cut at approximately 70 degrees and are stable. The excavation is shown in the photographs in Figures 4 and 5. Firewood and timber processing materials will not be allowed to remain or to be deposited on to the proposed quarry site.

Figure 4: View of Existing Disused Quarry Excavation - Looking North

Note: firewood and vegetation will be removed from the site as part of the quarry start up phase.

Figure 5: Eastern Extension to Old Quarry Excavation, Partially Backfilled with Soil and Inert Fill - Looking South

Note: This area is proposed to have the main sedimentation pond installed with an outlet to a stream in the middle distance, and has the access track into the quarry on the high ground to the right. The wood processing piles in the back ground are outside the quarry site.

To the east of the main area of the excavation there is another section of the old quarry that has been partially backfilled with earth and topsoil over the floor or the excavation, as shown in Figure 5. This section of the quarry contains the main drainage ditch that exits the excavation to the South, adjacent to the entrance gate. The easternmost part of this old excavation has been completely backfilled. The fill is likely to be a mixture of concrete, bricks, general rubble and lumber waste amongst others. This tip is not included within the extraction area or the site boundary.

Three small topsoil stockpiles are located to the NW of the old excavation area, the largest being 90m long, 20m wide and 3m high. They are all currently stable and grassed over.

Immediately to the west of the entrance gate there is flattish ground on either side of the access road into the excavation, up to 20m wide, partially covered in some quarry waste and soil.

1.3.4 Geology

The geology of the site comprises Quaternary alluvium formed within old river terraces of the Waingawa River. The alluvium comprises predominantly gravel and cobbles with a matrix of coarse sand, with a small amount of fine and medium sand and minor silt (estimated at approximately 5%). There are occasional lenses of laminated sands with gravel. The gravels and cobbles are well compacted and poorly sorted, the clasts being generally subrounded to subangular and flattish, with some indistinct current bedding. Most cobbles are up to a maximum diameter of 0.25m, though there are rare larger boulders up to 0.4m in diameter. Figure 6 shows the typical materials that will be quarried on site. The site is covered with up to 0.3m of topsoil and 0.5m of subsoil and low quality, weathered gravel and sand.

The existing excavation and a number of 6m deep exploration pits across the site have confirmed the presence of similar gravel and sand materials across the site, to a reasonable degree of certainty.

Based on the proposed extraction area outlined in Appendix B, the total potential resource for the site is approximately 275,000m^3 of material, assuming a maximum extraction level of 124m, which is approximately the groundwater level. Allowing for approximately 5% fines, this would give a total resource of just over 261,000m^3 of gravel and sand. The actual reserves available for extraction, processing and sale will depend on the accessibility of the resources within these extraction limits.

The only significant structural feature on the site is the small East-West trending ridge in the western portion of the site, which appears to be formed by an offset of a splay off the Masterton Fault (see Drawing C01 Appendix B). The Masterton Fault is an active fault and the main offset can be traced for a number of kilometres from the railway bridge at Masterton to west of the proposed quarry site. The QE2 covenanted wetland area is directly formed as a result of the movement of this fault, with the land to the south of the ridge having subsided. The land to the south of this ridge is either at or below the 124m level and hence there will be no extraction in this area (see Appendix B).

It is possible that other small faults will be encountered during excavation of the mineral resource, which should be noted and surveyed, and if necessary inspected by a suitably qualified engineering geologist or geotechnical engineer. The location of these faults will have an impact on the location of structures for quarry after use.

Figure 6: Typical In-Situ Profile of Gravel, Cobbles and Sand Forming Cut Slope in Old Excavation

1.3.5 Water Resources

The site does not intercept any surface water courses. The extraction area will not affect the water race that runs along the eastern boundary of the site, nor the QE2 covenanted area along the south eastern boundary. There will be a 10m standoff to the crest of the excavation from both the water race and the ditch adjacent to the QE2 area, in accordance with the Carterton District Plan Rural Industrial Zone permitted activity rules.

The floor of the existing old quarry excavation is currently at or near the ground water level at the site and water discharges from the quarry into drains that exit the site immediately to the east of the entrance gate. The assumed ground water level is approximately at the 123.5 to 124m elevation. The water from the excavation and the surrounding land drains into both the QE2 covenanted area to the west and another wetland area to the east, which is within the Kiwi Lumber property. The water which currently leaves the site appears to be clean and shows no obvious high sediment load, though as soon as it leaves the proposed extraction area it mixes with water from the backfilled excavation that runs along the eastern part of the south eastern boundary.

Rain that falls on the flat pasture land across the site soaks into the soil and runs off into either the old excavation or directly towards the QE2 wetland in the southwest corner of the site. There is likely to be very limited run-off from land surrounding the excavation to the north into the excavation, considering that the

topography is essentially flat and that there are no physical features, such as depressions or gullies that would tend to concentrate water towards the site.

1.3.6 Vegetation

The entire site is covered with grass with some mature exotic trees along the south western, north western and south eastern boundaries of the site. These are not expected to be removed as a result of quarrying activities and will act as additional screening for visual impact and noise. There are three native trees at the eastern end of the East-West ridge in the western part of the site, probably kanuka/manuka, which are likely to require removal as part of quarrying activities. The eastern extension to the old excavation has been partially backfilled with topsoil and has formed a small wetland area in places (see Figure 5), with tussock grass and gorse becoming established along with pasture grass. The QE2 covenanted wetland and its specific vegetation will not be impacted by the quarry, with a standoff from the excavation to the wetland boundary and water run-off controls to prevent discharge of sediment into the wetland area (see Section 2.2.7).

All topsoil will be stored on site and seeded with grass for later restoration of the quarry.

1.3.7 Archaeology

The site for the proposed extraction area is pasture, an existing excavation or an area of backfill/tipping from previous quarrying operations or industrial activities. There are no obvious archaeological sites associated with the excavation footprint and the Carterton District Plan does not show any sites as being registered. Considering the existing land use it is unlikely that there would be any significant sites. Occasional artefacts that may be uncovered during removal of the topsoil will be recorded and notified to the appropriate authorities (local Iwi and the Carterton District Council, refer to section 3.7).

1.3.8 Erosion and Sediment Control – Baseline Interpretation

In terms of the GWRC Erosion and Sediment Control guidelines the region fits into the "recent alluvial soils of the Wairarapa Valley" category with very low clay content and with a low silts and sands content. The soils structure is highly granular, well compacted and is clearly stable from observations of cut faces on site, and less prone to erosion compared with silts and clays. The 600mm average thick overburden topsoil layer is fertile and well grassed on the land that is not yet developed, offering a stable surface prior to stripping. Once fully reinstated with topsoil and grass, used areas should be stable in rainfall events. The soil permeability would be described as in the "high" range of Wellington regional soils given the high gravels and coarse sands content, even though the matrix is described as well compacted. Higher permeability soils tend to produce less runoff at a lower rate for a given rainfall event.

The topography of the area is flat compared to other Wellington regions, with runoff flows not expected to experience any large speeds if the quarry site is developed in a normal manner.

The Wairarapa region is in the low range of average annual rainfall amounts (800mm per annum compared to 1200mm for Wellington, Hutt Valley and Kapiti).

The Kiwi Lumber site has many inherently favourable characteristics in terms of managing the risks of erosion and sediment mobilisation. This should provide confidence that an erosion and sediment control plan that is developed along the guidelines of the GWRC should be effective as long as the principles of long term maintenance and adaptation of the plan are undertaken on a regular and professional quarry management basis.

The main reason for a cautious approach to sediment and water quality control is that the environmentally sensitive QE2 wetland reserve is close to the proposed quarry development and is to be protected from the impacts of the quarry.

2 Quarry Operations and Development

2.1 Overview

The purpose of the quarry operation is to extract the gravels and sands below the ground surface for use as building, construction and roading aggregates. The process of transforming the in-situ gravels and sands into aggregate products comprises firstly stripping of the vegetation, soil and low quality subsoil mixed with gravel and sand, which overlie the mineral resource. The next step is to excavate the gravels and sands with the use of heavy machinery. The extracted mineral is then either stockpiled as "run of quarry" material and later processed, or transported directly to an on-site processing plant where it is screened and crushed to produce different aggregate products of different size ranges and grades. A small proportion of the crushed product (approximately 20%) will be washed to produce concrete aggregates. The following sections provide a more detailed description of these activities.

2.2 Brief Description of Activities

2.2.1 Vegetation Removal and Site Preparation

This will include removal or any trees, bushes or turf on the site. It may not be possible to separate the turf from the topsoil, which will be stockpiled separately. As discussed in Section 1.3.6, there are only three trees that are likely to need removal, with the remaining trees around the perimeter being left in place. The remainder of the site is covered with grass and occasional gorse and broom bushes. A vegetation and landscape management plan (VLMP) for the site is not considered necessary, considering the small amount of vegetation requiring removal. There are no buildings that require removal.

2.2.2 Soil and Overburden Stripping and Stockpiling

Topsoil and subsoil stripping will be carried out using an excavator and truck to transport the materials to the stockpile area. The stripping will be similar to the existing excavation, as shown in Figure 7 below.

Figure 7: Pre-stripped Northern Section of Existing Excavation - Looking Northeast

Since the overburden is only a maximum of 700mm thick, there will be no issues with respect to the stability of any cut slopes formed in this material. The stripped topsoil and materials will be stored in stockpiles similar to those already on the site and in a perimeter bund. They will be grassed over to prevent dust issues and will be constructed no more than 7m high with slopes at a maximum angle of 1 vertical to 2 horizontal (approximately 27 degrees), to maintain long-term stability. The precise position of topsoil and subsoil stockpiles will be determined during detailed quarry planning and operation, but will most likely be distributed around the perimeter of the site close to where they are excavated. A two to four metre standoff will be established between the toe of the slope of any perimeter bund and the crest of the quarry excavation. The bunds will help mitigate any visual impact and will provide a buffer against noise from the site. They will also be important in diverting clean run-off water around the site and limiting the amount of storm water run-off from outside the site boundary.

Based on an average thickness of 0.6m, the total volume of topsoil that will need to be removed during the life of the quarry is approximately 56,000m^3. The volume of the existing topsoil stockpiles, which will need to be relocated at some time during the operation, is approximately 3600m^3.

Topsoil and subsoil overburden will be removed on a periodic basis in advance of the main extraction activities, in order to minimise disturbance to the site and reduce the amount of topsoil storage required at any one time. Since the excavation will be progressively restored as it is being worked, the total amount of soil to be stored will be significantly less than the total volume for the whole site.

2.2.3 Sand and Gravel Extraction

Gravel and sand extraction will be carried out using a backhoe excavator operating from behind the crest of the slope. The digger will load out the gravel and sand onto the quarry floor, forming a pile of excavated material. This will then be picked up by a front-end loader and taken for stockpiling as run-of-quarry material, or directly to the processing plant, depending on the production requirements at the time.

No blasting is required to excavate this material.

The slopes will be excavated at a similar angle to those currently in existence on the site, at between 60 and 70 degrees (2V:1H) as shown in Figure 8 on the following page. These slopes are currently stable at these angles. However, when working behind the crest of the slope, the tracks of the excavator must remain perpendicular and not parallel to it, to ensure that minor degradation of the face crest does not destabilise the excavator and to allow for rapid pullback in the case of instability.

Final, long-term excavated slopes will be cut at an angle of 1V:2H (approximately 27 degrees), unless buttressed by restoration fill, in which case they will be steepened, though at present this is not considered to be required.

Figure 8: Existing Quarry Excavation Face, up to 4m High - Looking Northeast

Maximum slope heights in the excavation will be up to 6m in the northeast corner of the site, reducing to effectively zero in the far western part of the site, but generally ranging between 4 and 5m in height.

2.2.4 Quarry Development and Extraction Limits

The maximum extraction limits for the excavation are shown on plan C03 in Appendix B. The actual extraction limits will be governed by stability requirements, proximity to water courses, proximity to the Radio New Zealand mast and earth mat structure, soil storage stockpiles, operational requirements and stand-offs to vegetation, but will not exceed those shown on the plan. The excavation extraction limit represents all the material available down to just above the water table at the 124m elevation and will be taken to the site boundary where no stand-offs are required. It is expected that the base excavated level will be at 124m elevation where the ground water table is understood to rise to in wet winter months (to be confirmed by regular borehole monitoring on site over the coming year). Excavation below 124m elevation will only be in localised areas to provide sedimentation facilities and silt traps during the quarry operational phase.

The precise layout of the quarry faces over the proposed life of the quarry will depend on the actual production requirements and practical excavation constraints. However, the excavation will be developed initially by advancing the existing quarry faces to either the southwest, towards the western limits of the site, or to the northeast. Because of the East-West ridge formed by the fault, the excavation in the far western portion of the site will terminate effectively along the base of the ridge and the southern limit of the excavation will have no cut slope.

There is a requirement within the Profit a Prendre to "ensure that no more than 60% of the Land constitutes the open quarry or quarries area from time to time and to lay down the balance of the Land from time to time

in good quality pasture throughout the term of this Profit a Prendre." This will then limit the overall quarry working area and allow the excavation to be progressively restored.

The total area of quarry excavation is approximately 9.2 hectares. 60% of this is 5.5 hectares of maximum open quarry area at any one time. However, it is anticipated that the active working area will be substantially less than this at any one time in the order of 3 hectares, dependent upon demand for aggregate and the operation of the quarry.

2.2.5 Mineral Processing

Minerals will be processed by means of a mobile screening and crushing unit to produce the required aggregate products. Approximately 20% of the product will be washed to produce concrete aggregates. The existing quarry floor is sufficiently large enough to accommodate this mobile plant and provide good access for mobile equipment and stocking areas. Processing is likely to be on a periodic basis, once existing stockpiles are close to depletion, but may be permanent, depending on economic and production requirements.

The mobile screening, crushing and washing plant will always be located on the floor of the excavation, which will limit visual impact, noise and dust effects. The location of the process plant may vary within the quarry floor from time to time, depending on the proximity of the excavation to the plant area.

The washing process for the concrete aggregates will produce some silt laden water which will require settling out in sumps or sediment pits before it is discharged from the site. This is further discussed in Section 2.2.7 below.

2.2.6 Storage, Distribution and Access

Gravel and sand will be stored on site on the floor of the excavation, close to the process plant area. There is currently sufficient flat space to establish a stocking area for the maximum amount of gravel required at any one time, which would be approximately 8,000 to 10,000m^3, of which the majority would be roading base course aggregate (80%) and the remainder sealing chip and concrete aggregates. The maximum dimensions likely for any stockpiles on site would be between 7m and 8m in height, giving a diameter of approximately 22 to 23m, assuming an angle of repose of the processed materials of 35 degrees, which will produce stockpiles with volumes between 8000 and 10,000m^3. Depending on the actual layout of the plant area, it is likely that the stocking area would consist of a number of smaller stockpiles, between 4 and 5m high, with diameters of between 10 and 15m and volumes of 1000 and 3000m^3 respectively. There would be no operational requirement to cover the stockpiles or to place them in specific stocking bays.

Trucks will be loaded directly from the stockpiles into haul trucks, which will then exit the quarry via the main access ramp in the middle of the south eastern boundary of the site. The main quarry ramp is unlikely to change its position during the life of the quarry and the weighbridge will be located close to the gate, on a 10 to 12m wide area of natural ground above the quarry excavation (see proposed excavation plans in Appendix B). This area will need to be levelled and cleared of a minor amount of quarry waste, but will be suitable for temporary buildings such as the weighbridge, office and toilet, making sure that there is a standoff of at least 5m to the edge of the existing quarry excavation. The existing gate will be used for access to the site. From the site to the public road a dedicated road will be constructed across the Kiwi Lumber site.

2.2.7 Water Management

Water management at the site is an integral part of the operation and is required to minimise any potential effects of the quarrying activities on watercourses and land outside the site boundary (refer to Appendix B – Erosion and Sediment Control Plan, including plans). In the case of the proposed Kiwi Lumber Quarry Site, the in-situ ground materials are gravels, sands, silts typical of ancient floodplains and provide ideal subsurface drainage characteristics when the ground water table is not a factor. It is expected that the site will drain into the gravels well during the summer months when the water table has been drawn down and will pond at a level of about 124 m elevation during the winter months as observed over the last two years due to what appears to be an average winter high water table level in this area.

The site naturally drains to the south and southwest into the wetlands formed by the subsidence of ground to the south of the Masterton Fault. The existing excavation currently drains to the east via a cut ditch in the quarry floor (see Figure 5), where it meets another ditch emerging from the base of the filled part of the old excavation (see Figure 6). At this point a third ditch takes run-off water south, away from the site, to a culvert under the access road immediately to the east of the site entrance gate (see plans in Appendix B).

Because the site does not intersect any watercourses and because of the very shallow gradient of the natural ground surface, the amount of runoff is likely to be restricted to rainfall immediately within the quarry excavation and the immediate area surrounding the site. A minor amount of high-level ground water would also be expected to seep into the excavation from adjoining land during and after major rainfall events. As quarrying proceeds, surface water run-off will either enter the quarry excavation directly, or be directed to the low-lying area adjacent to the QE2 wetland in the south western corner of the site. Currently, in this area a 5m wide ditch in front of the existing boundary fence to the wetland serves to control water run-off from the site (see Figure 4). This ditch flows directly into the wetland area. As the excavation approaches the wetland area, a 10m standoff will prevent mixture of any sediment laden water within the excavation from mixing with the undisturbed water in the wetland and the boundary ditch. Grassed topsoil bunds placed around the perimeter will be sufficient to prevent any excess run-off water from outside the site entering the excavation.

The water race running along the north eastern boundary is at a level above the majority of the surface of the site and it is unlikely that any sediment laden water will enter the stream as a result of quarrying operations. A 10m standoff from the perimeter of the excavation to the edge of the water race will help mitigate disturbance of the boundary area and prevent leakage into the excavation, as will the undisturbed area under which the Radio New Zealand earth mat structure is paced, with the perimeter bund protecting against flooding of the workings. Flooding of the Waingawa River is not likely to affect the site, since it is at least 1.5km away from the river and raised approximately 6m above the normal river level.

Materials excavated from the extraction area will be immediately placed on the quarry floor, thereby containing within the excavation any sediment laden water that runs off these materials. At the western end of the site, where there is no retaining cut slope, it will be necessary to construct a bund to control run-off from the extracted mineral into the perimeter ditch.

Run-off water control within the quarry will be concerned with significant discharges of any sediment laden water from the quarry excavation into the wetlands to the south of the site, particularly the QE2 covenanted area, and especially during storm events. Quarry runoff during heavy rainfall events will be contained on site by the encircling high ground and the 1 metre high perimeter bunds constructed adjacent to the QE2 wetlands when development is in the vicinity of that area. The bunds of the pond would be 20 metres away from the QE2 wetland over a length of 50 to 80m. The catchment area of the quarry is all that is expected to contribute to flooding and the gravel floor will soak away rainfall unless the water table is high during the winter months and the rainfall will then collect on the quarry floor. The ponded water in the quarry will both soak away into the ground on the sides of the quarry and drain out of the quarry through the main sedimentation pond and decant structure in the eastern extension of the existing quarry excavation (refer to Appendix B), where there is presently a small area of wetland and some drains, as shown in Figure 5. During an extreme rainfall event much of the developed quarry floor would be expected to be under to a level slightly higher than the ground water table level for a timeframe measured in no more than a few hours or days. The sedimentation pond and perimeter bunds will act to release the ponded water through the sedimentation pond and undergo some measure of treatment.

It will be important to place sensitive equipment and stores that are in the quarry workings at a level above the bund level at approximately 125m elevation. This can be determined by the quarry manager.

Based on the Wellington Regional Council Erosion and Sediment Control Guidelines, the surface area of the retention pond needs to be approximately 2% of the total working quarry floor catchment of 9.2 Ha in order to efficiently settle out sediment. This gives a total area of approximately 2400m^2. However, the intention of the quarry is to operate with, at most, 60% exposed quarry surface area at any one time by the staging of the work area and the progressive reinstatement of fully-developed areas. This means that up to 5.5 hectares may be opened up at one time – requiring a minimum of 1100m^2 of pond surface area. Areas that have been

reinstated can be bunded around their perimeter and allowed to soak away rainfall into the gravel base or to divert clean water away from the sedimentation pond.

The Erosion and Sediment Control Plan (E&SC Plan) for the Kiwi Lumber Quarry site is included in Appendix B.

The E&SC Plan allows for a 45m long by 15m wide pond, running along the existing northern edge of the excavation, as shown on the site plans in Appendix B. This corresponds to a recommended length to width ratio of 3:1 for efficient settlement and mitigation of short circuiting. This pond is 675m^2 in area and would be large enough to treat the run-off from 3.2 hectares of the site. The proposed operation of the quarry will mean that up to 5.5 hectares of the quarry floor could be exposed at one time and in this case additional pond capacity of 400m^2 closer to the development area would be installed. These stages of the quarry development are shown in Drawings C01, C02 and C03 in Appendix B.

The only other major source of sediment will be from the washing of the run-of-quarry material as it is crushed and processed into saleable aggregate products. It will be important to have separate sumps to the main run-off pond, since these will have higher volumes of sediment, but a controlled rate of discharge, and discharge into the ponds will be periodic, during operation of the plant. The location of these sumps will change depending on the location of the processing plant and whenever they fill up with sediment. Settlement of fines will be within sediment sumps dug into the floor of the quarry based on the guidelines of the GWRC Erosion and Sediment Control guidelines.

The quantity of fines is not expected to be large and they will be incorporated into the backfill of the excavation as quarrying proceeds. Based on a maximum silt content of 5% and that only 20% of the natural gravels processed will be washed for concrete aggregates, a total of approximately 5,300m^3 (refer to Appendix B) of material will need to be settled out during the life of the quarry. This would require a maximum pond area of approximately 60m x 30m with a depth of 3m, but in reality will comprise a number of smaller ponds which will be backfilled or dug out progressively as they silt up, or cleaned out and re-used.

The sediment loadings from the gravel crushing process are much larger than normal sediment loadings from bulk earthworks and will be concentrated and controlled around the crusher plant. One sediment sump at a time will be excavated and the rate at which it silts up would be measured and become an input into the next sump size. Water in the sump that does not soak away into the gravel base during the dry months can be pumped from a filtered vertical standpipe in the sediment sump out to the main sediment pond for treatment. Sump water may be able to flow over the quarry floor under gravity to the sedimentation pond if levels allow.

Water that is required to be used for the washing of the aggregate on site will be extracted from the Carterton District Council administered storage pond, which is fed from the west by the water race running along the northern extent of the proposal site. An agreement between the applicant and Carterton District Council has been reached, allowing the proposed quarry operation to extract 11 litres per second from the storage pond for its proposed extraction duration (Appendix A). The agreement will allow for ample water supply to wash the extracted material, and will negate the requirement to construct a bore to take water form the aquifer.

There is sufficient space within the existing quarry excavation to excavate the main sediment pond and the first sediment sump prior to commencement of crushing operations. The precise location of the sediment sumps beside the crushing plant will be determined at commencement of operations, but will be within the existing quarry excavation. Subsequent sediment sumps will be located depending on the development of the quarry and the location of the process plant. The Drawings of Appendix B show the anticipated size and positions of supporting sediment ponds to control runoff as the quarry develops through its stages. These positions can be expected to have minor adjustments as the quarry develops.

2.2.8 Rehabilitation and Landscaping

The Profit a Prendre document between Wairarapa Aggregates and Kiwi Lumber states that: "At the termination of this Profit a Prendre to leave the Land in a tidy condition with the open quarry and quarries area level and in a condition which complies with all the provisions of all resource consents and local body

requirements and which shall be left in a state no lower than 0.5 metres above the highest level that the winter water table reaches under the Land during the term of this Profit a Prendre."

Backfilling of the site for restoration purposes will occur periodically during the operation from stripped topsoil materials stored in stockpiles on the quarry floor before being transported to the final location within the worked out excavation. The final level of the backfill will depend on the maximum winter water table level, which will be more accurately established by observation and measurements during the life of the quarry (refer to Appendix B), but is currently assumed to be approximately at the 124.2m elevation.

Topsoil and subsoil will be placed from the stockpiles over the quarry floor and the excavated slopes of the excavation, and the land will be given over to pasture. The final landform will be a shallow depression, with final slopes of 1V:2H around the perimeter, generally between 4 and 7m high, but open to the southwest, where the ridge means that there will be no excavation face.

3 Environmental Effects and Management Measures

3.1 Noise

Noise levels will be governed by the guidelines within the Carterton District Plan, covering rural industrial areas. These are as follows. No activities, except temporary activities, may generate noise which exceeds the following limits measured at the boundary of any site zoned rural environment:

55 dB(A) L10 from 7am to 7pm daily
45 dB(A) L10 and 75dB(A)LMax from 7pm to 7am daily

These levels will be monitored periodically during the operation of the quarry, particularly at the start up of operations. All noise levels will be measured in accordance with NZS 6801: "Measurement of Sound - Methods of Measuring Noise: 1991", and assessed in accordance with NZS 6802:1991 " Assessment of Environmental Sound - Assessment of Noise in the Environment: 1991", or in accordance with any subsequent New Zealand Standards that concern the measurement and assessment of noise in the environment. The noise will be measured with a sound level meter complying with the International Standard IEC 651 (1979): Sound Level Meters, Type 1. The main sources of noise will be the process plant, the excavator, loader and haul trucks.

To comply with the District Plan standards and to ensure noise does not exceed acceptable levels a range of operational practices will be implemented, including the following:

a. Managing the time and location of particularly noisy operations around the site.
b. The mobile processing plant will be located on the floor of the existing quarry, which will reduce the noise level at the boundary of the quarry.
c. Machinery will be regularly maintained to ensure that noise produced from machinery is kept to a practicable minimum.
d. Bunds will be constructed where appropriate on quarry boundaries to reduce the effects of noise beyond the boundary of the quarry.

To ensure that the noise performance standards set in the District Plan are met, monitoring will be carried out on representative occasions using appropriate equipment, methods and personnel.

3.2 Traffic

Whilst the effects of traffic on public roads outside the quarry site are generally beyond the control of Wairarapa Aggregates and outside the scope of the QMP, practicable steps to reduce any effects of traffic directly related to the quarry operation will be taken, particularly related to noise and dust. These will include:

a. Generally restricting quarry dispatch times to the following hours:
   Monday to Friday 6:30am – 6:30pm
   Saturday 6:30am – 4:00pm
b. All Wairarapa Aggregates owned and operated vehicles will be regularly maintained and checked to ensure that appropriate noise and emission suppression devices are installed and operating effectively.
c. Any customer whose vehicle is noted as having excessive emissions due to lack of maintenance will be requested to rectify the problem and warned that they may be refused products on their next visit if the problem persists.
d. Loader drivers will be appropriately trained to help ensure that customers' trucks are loaded securely. It is the responsibility of the individual truck drivers to make sure their load is secure before they drive on a public road.

3.3 Dust (Air Quality)

Dust can be generated by many different activities that are carried out at the quarry site including: crushing, extraction, trucks and machinery. Wairarapa Aggregates will ensure that adequate measures are taken to control the emission of dust from all parts of the site. The objective of this section of the QMP is to avoid, remedy or mitigate adverse nuisance or amenity effects of dust from quarry operations beyond the boundaries of the quarry site. Of the potential discharges to air, particulate emissions of dust have the greatest potential for off-site effects. However, provided the operation site is well controlled and the activities well managed, particulate emissions can be kept at a level where any adverse health or nuisance effects, or damage to vegetation will not occur.

Measures to implement the air quality objectives will include the following:

a. Locating the mobile processing plant within the excavation and away from the quarry boundaries.
b. Maintaining large volumes of water on site, which will be available for dust suppression purposes.
c. Ensuring that areas of exposed material with dust generating potential, such as ungrassed topsoil and subsoil bunds and stockpiles, are kept to a practicable minimum.
d. Vegetating topsoil and subsoil stockpiles as soon as possible to limit dust generation potential.
e. Using a water tanker to spray water on working areas during dry and windy weather conditions.
f. Ensuring that potentially dusty activities are not carried out when weather conditions could give rise to offsite dust emissions.
g. Regularly undertaking proper maintenance and tuning of the vehicles and equipment, this also assists in avoiding any off-site effects.
h. Requiring the quarry manager or his or her nominee to record daily:
    - visual emission of dust;
    - sources of visual emission of dust;
    - measures initiated in response to visual emission of dust to prevent recurrence or mitigate effects;
    - water cart use (yes/no);
    - weather conditions (wind strength and direction, rainfall).

The operator will comply with the conditions of any discharge permit issued by the regional council, and any relevant associated land use consent conditions. This is likely to include regular monitoring, general operations to limit generation and discharge of dust (as outlined above) as well as implementing measures to reduce discharges if they are found to approach unacceptable levels.

3.4 Landscape and Visual

The effect of quarrying on the landscape will be minimal, since the site is located in a flattish area of ground, the excavation will be partially backfilled and the maximum depth of the excavation will be approximately 6m in the northeast corner (with the current ground level at 130m). The nearest dwellings are approximately 250m to the east, 350m to the northeast and 850m to the southwest, and the site is not visible from these locations.

3.5 Rehabilitation and End Use Objectives

The provision in the Profit a Prendre to restore the land to good pasture is in keeping with the existing land use of the quarry site.

3.6 Hazardous Substances

This section of the management plan deals with issues relating to the release of hazardous substances from storage facilities or during their use, transport or disposal within the quarry site. The objective is to avoid, remedy or mitigate the potential for adverse effects on the environment of the storage, use, disposal and transportation of hazardous substances such as diesel and oils.

To meet this objective, the following measures will be implemented:

a. Only the quantities of material necessary for the operation of the quarry will be stored on site.
b. All transport, storage and operating conditions meet the requirements of licences under the Hazardous Substances and New Organisms legislation and the relevant standard for the transportation of hazardous substances NZS 5433.
c. Fuel, lubricant and waste oil storage, dispensing and operating facilities are designed and operated in such a way that contamination of soil and water is avoided as far as practicable.
d. Drums and smaller containers will be stored on bunded pads in a designated area.
e. Vehicles in use on site will be well maintained and operated to ensure that no accidental spillage or loss of fuel or lubricants occurs.

3.7 Tangata Whenua

Whilst the quarry area is small, does not cut any water courses and does not appear to have any sites of archaeological interest, it is still important to operate the quarry in a manner which recognises and provides for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu and other taonga. This is especially important since the wetland to the south of the site may have cultural significance. To achieve this, the following will be implemented by Wairarapa Aggregates.

Tangata whenua will be identified and consultation will be undertaken to develop a procedure to deal with any discovery of koiwi and taonga. Procedures such as the following could be followed should evidence or indications of koiwi or taonga be discovered:

- Immediately koiwi or taonga have been discovered, activity around the area of the discovery will cease and an archaeologist brought in;
- The archaeologist will immediately arrange to secure the area to ensure that the suspected koiwi or taonga remain untouched;
- Tangata whenua and the Historic Places Trust will be advised that it is suspected that koiwi or taonga have been uncovered on the site;
- A representative of tangata whenua will be asked to contact relevant kaumatua who are to guide and advise Wairarapa Aggregates as to the course of action to be followed and to immediately advise the archaeologist of the identity of the kaumatua and such other details as may be appropriate in the circumstances;
- The archaeologist will arrange staff/Carterton District Council to meet and guide kaumatua, police, DOC or Historic Places Trust representatives to the site, and assist with any requests that they may make;
- If the kaumatua are satisfied that the koiwi or taonga are of Maori origin the kaumatua will implement appropriate procedures and will communicate this to Wairarapa Aggregates, NZ Police and other relevant parties;
- Wairarapa Aggregates will ensure that the kaumatua are given the opportunity to perform karakia and other religious or cultural ceremonies and activities considered appropriate in accordance with tikanga Maori (Maori custom and protocol).
- Wairarapa Aggregates will make available on the property other suitable, secure non working areas for the reburial of koiwi or taonga if tangata whenua so wish.

Definitions

Koiwi means human remains such as skeletal material.
Taonga refers to cultural artefacts such as implements, weapons or decorations traditionally and historically utilised by tangata whenua and includes parts and remains thereof.

Appendix A: Carterton District Council – Water Take Agreement

Carterton District Council

13 May 2008

Callum Sayer

P O Box 9624

Te Aro

Wellington

Dear Callum,

Subject: Wairarapa Aggregates Ltd Water Take, Taratahi Water Race, Waingawa

I am writing to you in response to your request to take up to 11l/s of water from the Taratahi Water Race at Waingawa for approximately 350 hours per annum.

The actual water take to be spread over the year as your operations demand. The water will be used during the winning and processing of gravel from a land based extraction operation.

I can confirm that the Carterton District Council gives approval for this, subject to the following conditions:

- CDC may restrict or cease supply at any time, subject to verbal notification, if it experiences difficulties with the network such as a failure of the intake structure or if its consented take is restricted under the step down procedure in its resource consent as a result of low river flows,
- That your proposed water take shall not cause a noticeable reduction in the flow downstream of the extraction point,
- That the potentially contaminated water will be treated and returned to the network after use in accordance with a resource consent that will be obtained by your Company from Greater Wellington Regional Council,
- That this approval is for Three years and may be renewed thereafter upon request subject to water availability and conditions at that time,
- That this approval cannot be transferred to another party,
- That the water take can only be used for the intended purpose.

If you have any queries, please contact me.

Yours Faithfully,

Garry Baker

Operations Manager.

Appendix B: Erosion and Sediment Control Plan

Erosion and Sediment Control Plan

1.1 Introduction

This document is supplementary to "Wairarapa Aggregates Ltd. Kiwi Lumber Proposed Quarry Site, Masterton – Quarry Management Plan". The reader is referred to the Quarry Management Plan for any background information including location, land use, depth constraints, water table, location sensitivities and proposed staging of the quarry development.

This erosion and sediment control plan draws heavily upon the GWRC document *Erosion and Sediment Control Guidelines for the Wellington Region.*

1.2 Stormwater Diversion

The land above the site (to the north-east) is pasture on a flat gradient draining towards the quarry site (refer to figure1, Quarry Management Plan). There is likely to be limited run-off from land surrounding the excavation to the north and west into the proposed site, considering that the topography is essentially flat and that there are no physical features, such as depressions or gullies that would tend to concentrate water towards the quarry. The adjacent land is well grassed and will consist of a 0.5m thick topsoil layer covering a highly permeable gravel matrix, with an average high level winter water table some 2 to 4 metres below existing ground levels – as is found at the quarry site. Stormwater overland flow that does approach from this direction will be diverted along the cadastral boundary of the quarry development and drain to the west via a bund and diversion channel (refer to Appendix 1). The bund and channel will run the entire length of the north-western boundary of the site and then down along the Western boundary to the fault line. From here, the stormwater will drain into the water race adjacent to the QE2 wetland via overland flow.

The existing water race and bund running along the north-eastern boundary of the quarry will act as a barrier preventing overland flow entering the site from the east. The existing bund will provide protection for the site in the event of the water race flooding during high flows. The water race is understood to be controlled at some point upstream of the quarry site and is less likely to present a flooding issue to the development.

All bunds and channels have been sized using the rational method for a 5% AEP rainfall event, and are all less than 2% gradient.

1.3 Sediment Retention Ponds

The site does not intersect any watercourses and because of the very shallow gradient of the natural ground surface, the amount of runoff is likely to be restricted to rainfall immediately within the quarry excavation and the immediate area surrounding the site. A minor amount of high-level ground water would also be expected to seep into the excavation from adjoining land during and after major rainfall events, but during low water table periods the rainfall infiltration rate into the ground is likely to be high given the gravel country.

Particular care must be shown when discharging into the ecologically significant QE2 wetland area to the southwest of the site. Quarry run-off will be controlled by a sediment control pond excavated below the current quarry floor level of 124m, into the water table. The topography of the area shows slopes are much less than 10%, thus the ponds will be sized based on 200 m^3 of capacity for each hectare of contributing catchment. The best location for a sediment retention pond is in the eastern extension of the existing quarry excavation, where there is presently a small area of wetland and some drains, as shown in Appendix 1 (drawings C01, C02, C03, C05). It is proposed to develop the 9.2 hectares of quarry in three general stages. Each stage of excavation will have separate sedimentation control requirements.

Stage 1 will involve extending the existing quarry area to the north and to the east (refer to Drawing C01). The area of exposed surface is 3.2 hectares, thus the required size of the pond for this stage is 640 m^3. The excavation runoff from this area will flow into the existing man made ditch in the existing quarry area and then divert via a new drainage channel into the sediment pond. The decant structure in the pond will

outlet flows into an excavated channel from the pond to the stream to the east, and then through a culvert under the access road and off site. Perimeter diversion bunds will be constructed along the existing fences to prevent any clean water runoff from grassed areas entering Stage 1 excavations. A number of different channel alignments can be installed by the quarry management that lead to the sedimentation pond. The position of crushing plant and sediment sumps used in washed aggregate production will be determined by the quarry management, but there is ample room for sumps, equipment and vehicle movements from the start of production.

Stage 2 will involve the initial construction of a second sediment pond in the area of Stage 1. The size of the Stage 2 expansion is 1.4 hectares and the sediment pond size would be 300m^2 in area. Part of Stage 1 would be reinstated with topsoil, grassed and bunded around its perimeter while part of Stage 1 will be left open for vehicle movements and stockpiling. The western temporary bund will be removed and reconstructed so that it runs along the 124 m contour line (refer to Drawing C02). It is assumed that no material will be excavated below 124 m, giving a 10 m standoff buffer between the excavations and the QE2 wetland. The runoff from this area will be conveyed via a drainage channel to the 300m^2 sedimentation pond, decanted and discharged under the access road through a culvert, to the main sediment control pond. The total Stage 1 and Stage 2 area of contributing runoff will be 4.6 hectares minus the area that is reinstated. This requires a minimum of 920m^2 of pond area, the size of the two sediment ponds is 975m^2.

Stage 3 will involve the reinstatement of the Stage 2 area in topsoil and grass, the decommissioning of the Stage 2 pond when the reinstatement is completed, the reinstatement of part of Stage 1, and the development of quarry area to the north of the property (refer to Drawing C03). A perimeter bund around the Radio New Zealand mast and earth mat structure is to be carefully positioned to avoid interfering with the earth mat. The area of Stage 3 and the central part of Stage 1 total 6.1 hectares which is just over the 60% of area exposed limitation. A total pond area of 1220m^2 minimum is required. Staging at a micro-level will be required by the quarry management to develop some areas while other areas are still covered with grass or have been reinstated following development. An additional 800m^2 of sediment pond are shown near to the main sediment pond, all decanting and discharging into the same channel to the east. A rise of 0.5m is shown across the Stage 3 site to develop fall towards the ponds, and a network of shallow channels on the quarry floor are shown as suggested alignments.

In all stages, in an extreme rainfall event, the flat quarry floor has the potential to hold water behind the bunds and high ground surrounding the main sediment pond, thus preventing large flows from being released. The E&SC guidelines have been met and exceeded and the principals of erosion and sediment control such as minimise the disturbance, stage the construction, protect waterbodies, reinstate exposed areas, install perimeter controls, use detention devices, inspections and adaptations of the plan, have been included into the Quarry Management Plan.

Further confidence can be taken from the favourable characteristic conditions in the quarry area:

- highly permeable gravels,
- low silt content in the particle distribution,
- low topographical gradients,
- well compacted granular matrix with good existing topsoil and grass characteristics that are stable and hold their shape well when exposed,
- low water table during much of the year,
- low annual rainfall for the region,
- and an effective perimeter bunding scheme around the higher ground to the north of the site limiting the catchment area..

Sediment retention ponds, silt fences and silt socks will be maintained and monitored as part of the Quarry Management Plan to ensure effectiveness.

1.4 Maintenance Schedule for Treatment Control Structures

Maintenance of treatment structures will include the following items, with other items added by the Quarry Management as the operation is developed:

- Inspection of the operation of the sediment pond decant system and water quality discharging from the decant system
- Inspection of the forebay for concentration of flows
- Inspection of the dead zone in the pond for silting up, and removal of the sediment during dry weather
- Inspection of the perimeter bunds and channels for integrity
- Inspection of the sediment sumps next to the crushing equipment and the water quality discharging from the sump. Clean out sump or construct a new location.
- Inspect drainage lines and channels across the quarry site during wet weather
- Monitor ground water levels during of the months of the year to develop an annual profile.

1.5 Silt Fences

The earth bunds and surface water diversion channels around work areas will ensure no sediment laden water will escape the site via overland flow, thus eliminating the need for perimeter silt fences. However, silt fences will still be needed around topsoil stock piles, as runoff from these areas will be laden with sediment before grass has had time to take hold. Internal silt fences will be positioned at the bottom of cut slopes where no further excavation will take place for long periods of time, or until grass reinstatement is fully established.

Silt fences and filter cloth used in the control of water borne sediment will be regularly maintained in a controlled manner to keep the effectiveness of the devices at a high operational level.

1.6 Sediment Control Drawings

The proposed sediment and erosion control measures are detailed in drawings C01, C02, C03 and C05 (long section through main sediment pond) in Appendix 1.

QUALITY ASSURANCE STATEMENT

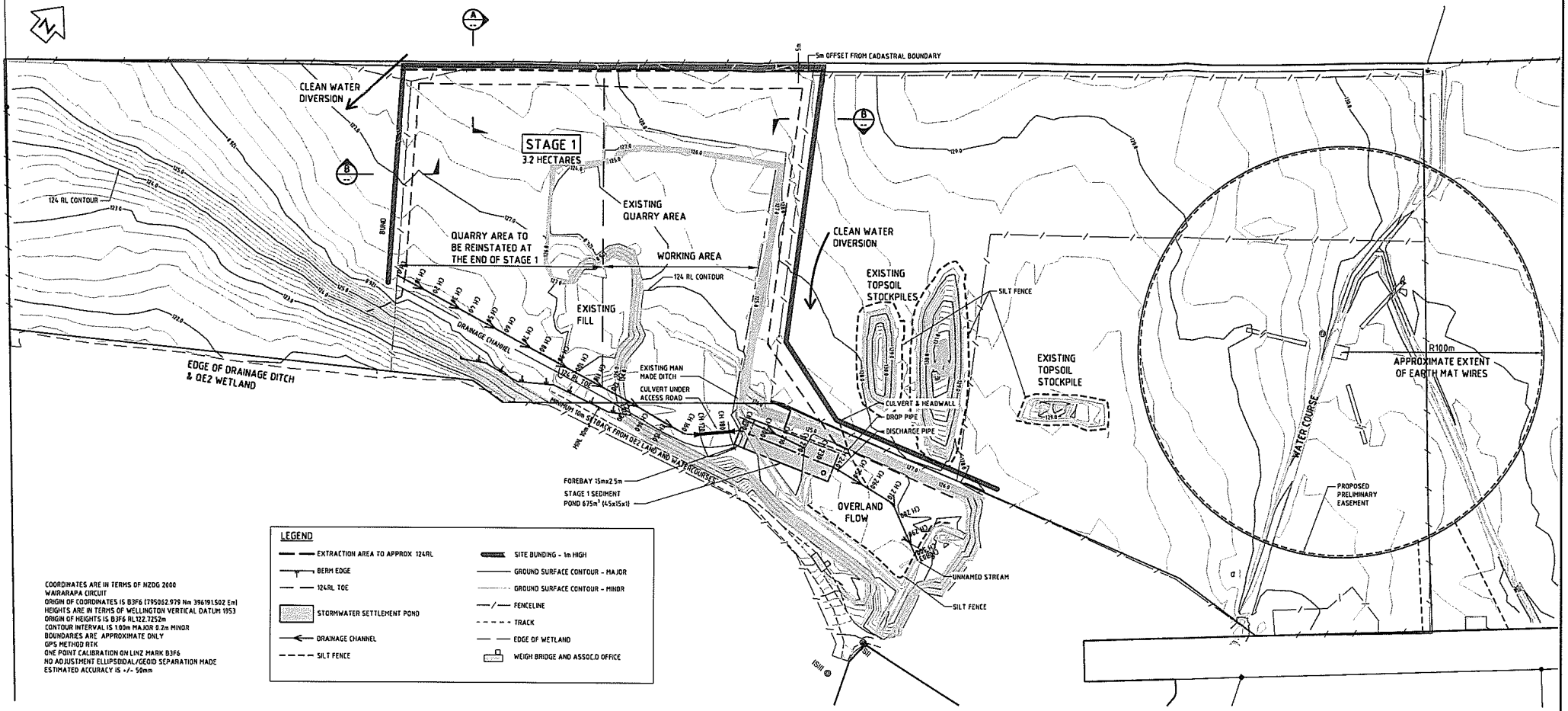
PROJECT MANAGER	REVIEWED BY
Sylvia Allan	Sylvia Allan/Callum Sayers/Gen Hewett
PREPARED BY	**APPROVED FOR ISSUE BY**
Richard Oldcorn/Ross Waters pp.	Sylvia Allan

WELLINGTON
Level 1, 123 Taranaki Street, Te Aro, PO Box 9624, Wellington 6141, New Zealand
P + 64-4-381 6700, F + 64-4-381 6739

REVISION SCHEDULE

Rev No	Date	Description	Prepared By	Reviewed By	Approved By
1	Nov 2008	Erosion and Sediment Control Plan added	RDW	NJK	NJK
2	Jul 2009	Feedback from GWRC added	NJK	SA pp.	GH

Appendix 1: Erosion and Sediment Control Drawings



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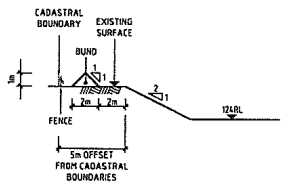

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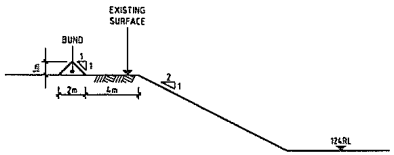


TYPICAL DETAIL B - EXCAVATION SLOPES
SCALE 1: 200

NOTES:

1. SILT FENCES TO TOE OF CUT FACES, REFER GWRC E&SC GUIDELINES
2. SILT FENCES TO SURROUND NEW TOPSOIL STOCKPILES
3. SEPARATE SUMPS ARE REQUIRED FOR 'RUN-OF-QUARRY' PROCESSING, SEPARATED FROM THE MAIN STORMWATER SETTLEMENT POND. REFER TO QUARRY MANAGEMENT PLAN FOR DIMENSIONS.
4. MINIMUM SEDIMENT POND VOLUME 648m³ FOR STAGE 1
5. EROSION AND SEDIMENT CONTROL PLAN TO CONFORM TO GWRC EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION.

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
C	AMENDMENTS FOLLOWING GWRC FEEDBACK	GBL	NJK	GH	22/07/09
B	EARTH MAT EXTENDED TO 100m RADIUS	JWM	NJK	GH	30/04/09
A	FOR CONSENT	JPH	NJK	SJA	28/01/09

	Name	Date
SURVEYED	NM BERRY	11/07
DESIGNED	R WATERS	11/08
DESIGN CHECK	N KEENAN	11/08
DRAWN	J MITCHELL	11/08
DRAWING CHECK	N KEENAN	11/08
APPROVED	S ALLAN	01/09

MWH

WAIRARAPA AGGREGATES
KIWI LUMBER SITE

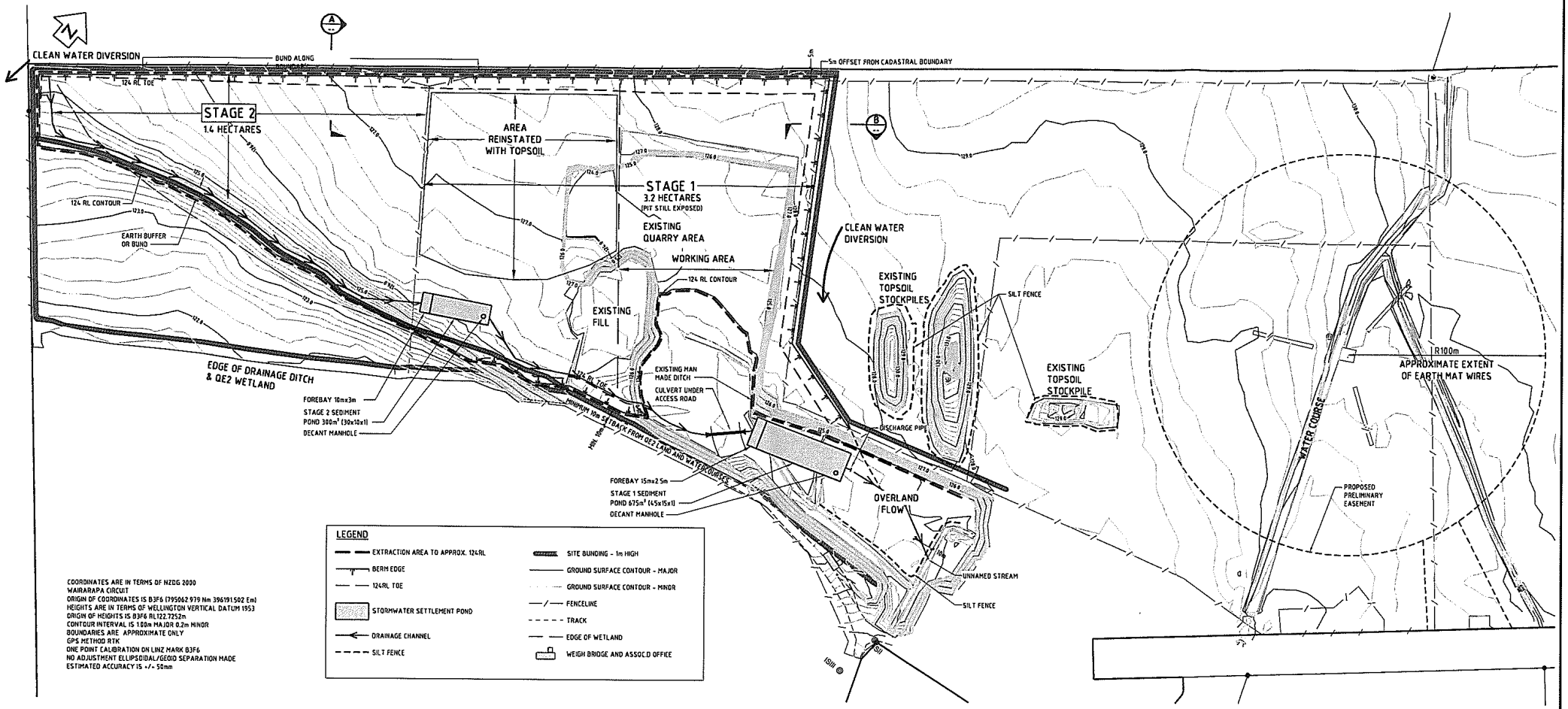
EROSION & SEDIMENT CONTROL PLAN
PROPOSED STAGE 1 EXCAVATION LIMITS

Status Stamp: FOR CONSENT
Date Stamp: 03/07/2009
SCALES (A1) 1:1000 (A3) 1:2000
Drawing No.: Z1449801
Sheet No.: C01
Rev.: C

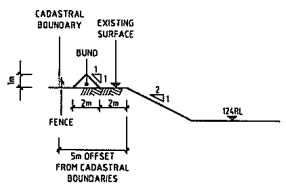
XREFS. X_Kiwi Lumber site survey, X_Model_Output_SurveySurface, X_Typical Detail

\\nzwgnlgent\projects\Z14000up\Z14498 - Wairarapa Aggregates\Z1449801 Kiwi Lumber Site\CAD [Copied from CHCI\Z1449801_C01.dwg

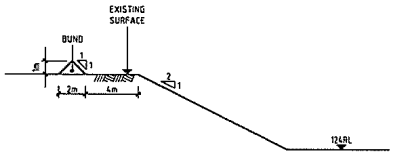
DO NOT SCALE - IF IN DOUBT, ASK
ORIGINAL SIZE A1



SITE PLAN
SCALE 1:1000



TYPICAL DETAIL A - EXCAVATION SLOPES ADJACENT TO CADASTRAL BOUNDARIES
SCALE 1: 200



TYPICAL DETAIL B - EXCAVATION SLOPES
SCALE 1: 200

NOTES:

1. REINSTATE FINALISED LEVELS IN STAGES A & 2 WITH TOPSOIL
2. SILT FENCES TO TOE OF CUT FACES, REFER GWRC E&SC GUIDELINES
3. SILT FENCES TO SURROUND NEW TOPSOIL STOCKPILES
4. SEPARATE SUMPS ARE REQUIRED FOR 'RUN-OF-QUARRY' PROCESSING, SEPARATED FROM THE MAIN STORMWATER SETTLEMENT POND. REFER TO QUARRY MANAGEMENT PLAN FOR DIMENSIONS.
5. MINIMUM SEDIMENT POND VOLUME 920m³ FOR STAGE 2
6. EROSION AND SEDIMENT CONTROL PLAN TO CONFORM TO GWRC EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
C	AMENDMENTS FOLLOWING GWRC FEEDBACK	GBL	NJK	GH	02/07/09
B	EARTH MAT EXTENDED TO 100m RADIUS	JWM	NJK	GH	30/04/09
A	FOR CONSENT	JWM	NJK	SJA	28/04/09

	Name	Date
SURVEYED	NMB	11/07
DESIGNED	R WATERS	11/08
DESIGN CHECK	N KEENAN	11/08
DRAWN	J MITCHELL	11/08
DRAWING CHECK	N KEENAN	11/08
APPROVED	S ALLAN	01/09

MWH

AMENDMENTS FOLLOWING GWRC FEEDBACK
KIWI LUMBER SITE

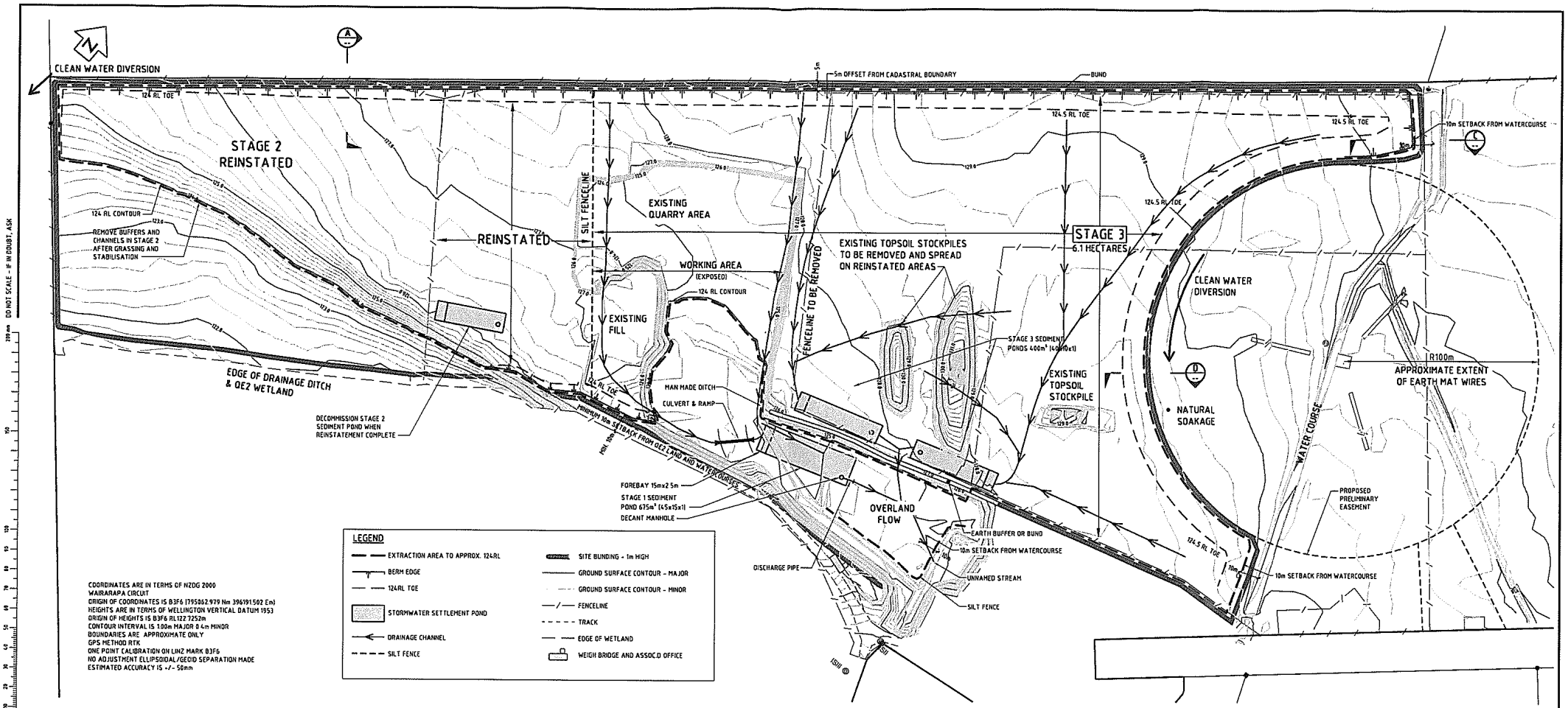
EROSION & SEDIMENT CONTROL PLAN
PROPOSED STAGE 2 EXCAVATION LIMITS

Status Stamp: FOR CONSENT
Date Stamp: 03/07/2009
SCALES (A1) 1:1000 (A3) 1:2000
Drawing No.: Z1449801 | Sheet No.: C02 | Rev.: C

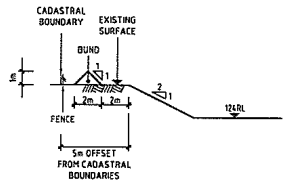
XREFS: X_Kiwi Lumber site survey, X_Model_Output_SurveySurface, X_Typical Detail

\\nzwgn1gen1\projects\Z14000up\Z14498 - Wairarapa Aggregates\Z1449801 Kiwi Lumber Site\CAD (Copied from CHC)\Z1449801_C02.dwg

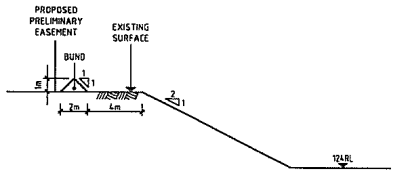
ORIGINAL SIZE A1 — DO NOT SCALE - IF IN DOUBT, ASK



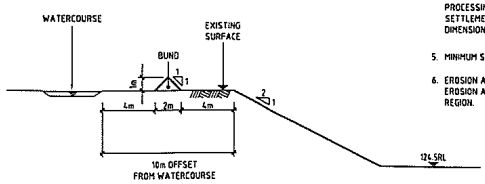
SITE PLAN
SCALE 1:1000



TYPICAL DETAIL A - EXCAVATION SLOPES ADJACENT TO CADASTRAL BOUNDARIES
SCALE 1: 200



TYPICAL DETAIL D - EXCAVATION SLOPES
SCALE 1: 200



TYPICAL DETAIL C - EXCAVATION SLOPES ADJACENT TO WATERFEATURES
SCALE 1: 200

NOTES:

1. REINSTATE FINAL LEVELS IN STAGES 1, 2 & 3 WITH TOPSOIL
2. SILT FENCES TO TOE OF CUT FACES, REFER GWRC E&SC GUIDELINES
3. SILT FENCES TO SURROUND NEW TOPSOIL STOCKPILES
4. SEPARATE SUMPS ARE REQUIRED FOR 'RUN-OF-QUARRY' PROCESSING, SEPARATED FROM THE MAIN STORMWATER SETTLEMENT POND. REFER TO QUARRY MANAGEMENT PLAN FOR DIMENSIONS.
5. MINIMUM SEDIMENT POND VOLUME 1320m³ FOR STAGE 3
6. EROSION AND SEDIMENT CONTROL PLAN TO CONFORM TO GWRC EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION.

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
C	AMENDMENTS FOLLOWING GWRC FEEDBACK	GBL	NJK	GH	03/07/09
B	EARTH MAT EXTENDED TO 100m RADIUS	JWM	NJK	GH	30/04/09
A	FOR CONSENT	JMH	NJK	SJA	28/03/09

	Name	Date
SURVEYED	NMB	11/07
DESIGNED	R WATERS	11/08
DESIGN CHECK	N KEENAN	11/08
DRAWN	J MITCHELL	11/08
DRAWING CHECK	N KEENAN	11/08
APPROVED	S ALLAN	01/09

MWH

AMENDMENTS FOLLOWING GWRC FEEDBACK
KIWI LUMBER SITE

EROSION & SEDIMENT CONTROL PLAN
PROPOSED STAGE 3 EXCAVATION LIMITS

Status Stamp: FOR CONSENT
Date Stamp: 03/07/2009
SCALES (A1) 1:1000 (A3) 1:2000
Drawing No.: Z1449801
Sheet No.: C03
Rev.: C

XREFS: X_Kiwi Lumber site survey, X_Model_Output_SurveySurface, X_Typical Detail

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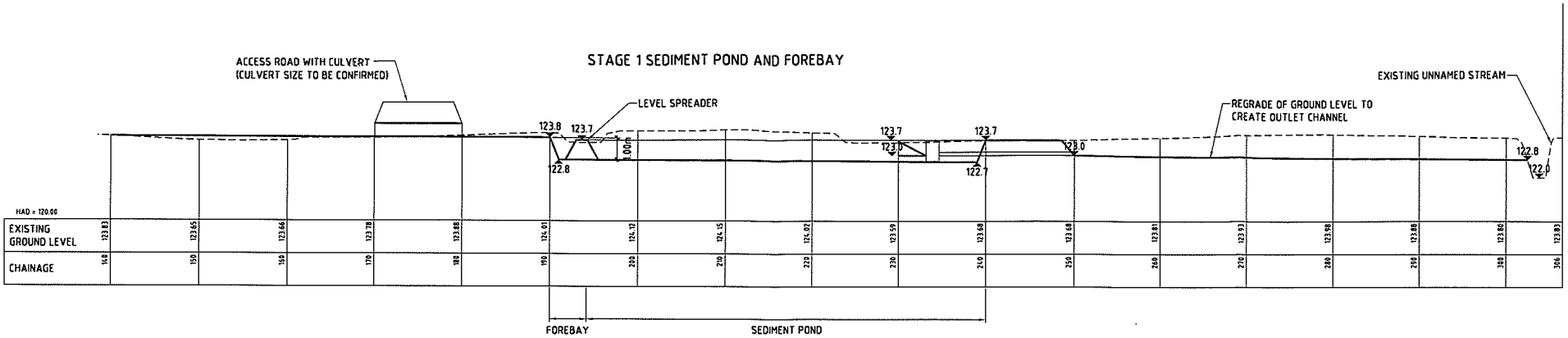
DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1



SECTION A C04 DRAINAGE CHANNEL (CH 140 TO CH 306)

SCALES - H 1 : 250
V 1 : 100

NOTES

1. EXCAVATION TO BE BACKFILLED WITH CLEAN EXISTING MATERIAL OR SIMILAR APPROVED.
2. DESIGN IS CONCEPT ONLY. ALL LEVELS AND POND SIZES WILL BE CONFIRMED IN DETAILED DESIGN.
3. REFER TO DRAWING C04 FOR POND LOCATION.
4. DESIGN TO CONFORM TO GWRC E&SC MINIMUM GUIDELINES.

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE
B	AMENDMENTS FOLLOWING GWRC FEEDBACK	GBL	NJK	SJA	02/07/09
A	FOR CONSENT	JMH	NJK	SJA	28/01/09

	Name	Date
SURVEYED	NMB	11/07
DESIGNED	R WATERS	01/09
DESIGN CHECK	N KEENAN	01/09
DRAWN	GB LOWE	01/09
DRAWING CHECK	N KEENAN	01/09
APPROVED	S ALLAN	01/09

MWH

WAIRARAPA AGGREGATES
KIWI LUMBER SITE

EROSION & SEDIMENT CONTROL PLAN
CONCEPT SEDIMENT POND DESIGN - LONG SECTION

Status Stamp: FOR CONSENT
Date Stamp: 02/07/2009
SCALES (A1) AS SHOWN (A3) HALF SCALE
Drawing No.: Z1449801 | Sheet No.: C05 | Rev.: B

XREFS :

\\nzwgnlgen1\projects\Z14000up\Z14498 - Wairarapa Aggregates\Z1449801 Kiwi Lumber Site\CAD (Copied from CHCI\Z1449801_C05.dwg