15 May 2018

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Ref: 5-G2858.01

REQUEST FOR FURTHER INFORMATION - RESOURCE CONSENTS RM175439-441; RM185003-5; RM185013-15

Dear Ros

Thank you for your further information request dated 2 February 2018. Below are responses to your questions. The opinions expressed regarding aquatic ecology are from Tom Kroos. Please contact me if you have any questions or you would like clarification.

Introduction and Background

This further information has provided an opportunity to review the design and proposal, however it is important to understood that the proposal is working within restrictions that have been imposed by previous Council decisions.

The area around Saxton Creek was originally zoned Rural, and Rural Small Holdings, in the Nelson Resource Management Plan (NRMP). Much of the area was used for horticultural purposes.

During the period 2004 -2006 the Nelson City Council updated its Nelson Urban Growth Strategy (NUGS), identifying potential areas for future development. One area was the rural land between Champion Road and Saxton Creek.

While the NUGS process was underway, subdivision applications were lodged by Suttons and by Wahanga Ltd, and these were approved by Hearing Commissioners. The final NUGS 2006 document confirmed the area for residential growth, recommending a structure plan be developed with Tasman District Council to coordinate roading and other servicing of the area.

The Structure Plan was prepared in 2008, in part to avoid continuing the fragmented subdivision in the area which had been leading to inefficient servicing and poor urban design. A plan change (Plan Change 18) to re-zone the land was notified in 2010. The plan change recommended a 20m wide esplanade reserve on both sides of Saxton Creek.

The esplanade provisions were opposed by affected landowners, but the Hearing Committee in its decision of 2012 on the Plan Change opted to retain the width of 20m on both banks.

During this period Saxton Creek was badly affected by flooding in the December 2011 storm event and the April 2013 flood, resulting in significant flooding to adjoining residential and commercial properties. In response, Council initiated a flood upgrade project in mid-2013.

Landowners appealed the esplanade requirements of Plan Change 18 to the Environment Court. After three years the appeal was eventually resolved by Consent Order, in 2015, setting a total reserve width of 22m (and 25m bordering the existing Daelyn subdivision near Saxton Field). These widths were negotiated with the appellants based on the proposed Saxton Creek design (rock lined) and agreed to by the Council (on agreed advice from both the Infrastructure and the Strategy & Environment Groups of Council).

Residential subdivisions have continued in the area, with developers avoiding capacity limitations on Saxton Creek (at least in the interim) by retaining or detaining stormwater within the development (through soak pits and/or detention ponds). This continued approach of approving the development of residential properties beside a neglected and significantly under sized flood channel has made upgrading the flood capacity of the creek even more critical.

In assessing this application, it is important to recognise the context of the esplanade reserve secured, and the width of reserve that is available within which to achieve the various objectives set out in Appendix 6 of the NRMP. These include flood capacity, access, recreation improvements, and conservation (aquatic habitat). Thus, the flood capacity works, the pathway for access and recreation, and riparian planting and enhancement, all must happen within the reserve width defined in the Consent Order. That width restricts the ability for a meandering stream channel, for example.

I would also note that this is the fourth resource consent application to date for the staged works on Saxton Creek. The consents for the first three stages have been granted and given effect to. The applications went through a process of consultation with iwi and landowners, and in each case the approach in the applications was recommended for approval by the consent planners, and approved by the independent commissioners. This current application in good faith has continued that approach. It is accepted that with the implementation of the earlier stages lessons have been learnt on how to better manage the environmental impacts of the works – for example, filling the voids in the rock channel to reduce loss of water from the actively flowing channel, and improving shading of the stream. With the consents approved to date there has not been a fundamental challenge or objection[1], by iwi, the commissioners or the regulatory section of Council, to the approach being taken.

1. In section 3.4 on page 22 of Annexure A the application states that the construction activity will take account of construction noise standards NZS 6803:1999. Can you please confirm whether or not the proposed activities will comply with REr.43 and RUr.47 (Noise) in the NRMP? If not a Land Use consent to exceed the permitted noise standards in the Rural and Residential Zone is required.

   It is not possible to say definitively whether or not the construction works will comply with the noise rules. The Stage 1 and 2 works were not required to obtain a noise consent. As a precaution, however, we consider it would be prudent for the applications to be amended to include a land use consent for potential breaches of rules REr.43.1 and RUr.37.1. We therefore request here that the land use consent applications for Stages 3A, 3B and 3C be amended to include consent for 'Construction noise in excessive of the permitted residential and rural limits'. In addition to condition 8, which is offered in the suggested conditions for the land use consent, we also offer compliance with the construction noise standard NZS 6803:1999. A modified assessment of environmental effects with respect to noise is included with this letter as ***Appendix A****.*

2. In section 3.4 on page 22 of Annexure A the application states that there will be a significant number of traffic movements to and from the site. Can you please provide an estimate of the likely number of movements from each access point on any given day and the number of days that that activity will occur for?

   We have undertaken calculations based on the volumes of cut-to-waste (material to be taken offsite) and rock to be imported. We have allowed for truck and trailers which the contractor would prefer to use as it

[1] The Stage 1 consent application (Saxton Field) was publicly notified as Council, as applicant, opted not to seek written approval from all directed affected parties. The application attracted two submissions – one in favour, one opposed. The opposing submission was concerned with the order of the staged works (seeking work start at the top, for flood control reasons). It did not relate to ecological matters. The Stage 2A and Stage 2B applications were processed non-notified.

is more efficient, but the limited access at some locations may restrict them to trucks only, which would restrict the capacity, and increase the number the truck movements. Under the worst-case scenario this would double truck movements, but that is an extreme case and not considered likely.

We have allowed for cut-to-waste and rock in separate trucks, but the contractor will try and back load i.e. take a load of cut-to-waste away, dump it, then fill up with rock and bring it back. This avoids double movements, reducing truck movements, but is not always possible.

The estimated volumes are as follows:

Stage 3A:

Cut-to-waste	*= 156 loads.*
Rock	*= 50 loads*
Total	*= 206 loads*

Entry and exit will use Ngati Rārua Street and will be spread over the 4-5 month construction period. During peak times, there could be 16-20 trucks per day. Ngati Rārua Street is classified as a sub-collector road. Sub-collector road function to distribute traffic at a neighbourhood level and form the link between Collector roads and Local roads[2].

Stage 3B:

Cut-to-waste	*= 750 loads*
Rock	*= 235 loads*
Total	*= 985 loads*

Entry and exit will be split equally between Saxton Field and Hill Street, and will be spread over the 8-month construction period. During peak times, there could be 8-10 trucks per day per entrance.

Stage 3C:

Cut-to-waste	*= 654 loads.*
Rock	*= 206 loads*
Total	*= 860 loads*

Entry and exit will be split equally between Ngati Rārua Street and Saxton Field, and will be spread over the 10-month construction period. During peak times, there could be 8-10 trucks per day per entrance.

Day to day movements will vary depending on the particular piece of work being done.

3. How will the meandering channel be designed and formed within the new channel profile?

For clarification, the meandering channel in this instance relates to the low flow channel. Initially the existing channel meanders are identified and marked with the ecologist and digger operator. The intention is to follow the existing meander footprint or improve the current conditions that have been compromised by flooding. It is realised that much of Saxton Creek that lies within Stage 3 has been historically managed as a drainage ditch and as such has been straightened after each major flood event.

As with the Stage 2 methodology the ecologist will work with the digger operator during the low flow rock placement. Where necessary the voids between rocks will be infilled with river run stones and gravel. This technique worked successfully on Stage 2 (pictured). The target for small meanders is one for every 10m of stream length.

[2] NCC Land Development Manual 2010.

Stage 2 Reach below RFD

4. How will the 300mm minimum depth- be implemented and maintained? (Plans in Appendix 1 and 2 of CGW report show a 200mm minimum depth in cross sections)?

   The 300mm was considered a minimum pool depth in the ecologist's report. It is favourable to achieve depths beyond 300mm. The 300mm prevails over the 200mm level shown on the plans, which will be modified accordingly.

   Site selection will be crucial as pools will be placed immediately below the horizontal log structures where the stream bed will be excavated to a deeper depth. As river flow passes over the logs the water velocity should keep the pool habitat intact while some gravel will deposit at the tail of the pool when as velocity dissipates. Where possible pool placement will coincide where canopy trees are planted on the bank (see planting plan). The target is one pool for every 50m of stream length, on average.

5. Please provide information on proposed reinstatement of pool habitat (quantity and quality) within the stream bed.

   See response to Question 4. Ideally there should be a range of pool sizes (length/width) and depths but constraints exist because the low flow channel is space limited. The ecologist will work with the digger operator in attempts to diversify pool habitat by varying the dig-out depth, length, and placement of materials including log and rock size.

6. How many logs and novacoil refuges will be provided along the length of the stream?

   The target will be one log for every 50m of stream length on average, but the physical nature of the site may vary the frequency (e.g. two log structures within 35m of stream length and no logs over a 65m reach). Novacoil is not expensive and can be placed where the best opportunities are. There will be no less than one novacoil refuge per 10m of stream length.

Discussions have been undertaken with engineers to provide some artificial bank covers at pool sites. These will be longitudinal placed sleepers and located where most appropriate with at least one every 50m. The hardwood sleepers are then covered in a medium to support Carex secta.

7. How will flow through these refuges be maintained in dry periods?

   Flow through the habitat structures will not always be possible. This is because the bed can become dry above the south branch confluence during extreme summer low flow conditions. This can be partly offset by placing habitat structures where they will optimise low flow conditions. Pools would be an example of locations for novacoil placement.

8. What is the net stream length that will be lost from channel realignment?

   Approximately 25m, which over the current length of about 880m is approximately 2.8% of the current length of Stage 3 works.

9. How will fish passage and ecological values be provided for between the Stage 3 and Stage 2 works once the Waimeha detention pond is removed? Confirmation is also required that the Waimeha detention dam mentioned in the CGW report is the instream 'gravel trap' near the Riding for the Disabled entrance. Currently this 'gravel trap' does not provide adequate fish passage.

   The Waimeha detention pond is not the 'gravel trap' near Riding for the Disabled. The Waimeha detention pond is near the end of Ngati Rarua St and shown on the plans e.g. Sheet 304 and 305. It is not part of the natural stream network. It is an artificial stormwater detention pond created by the developer of the Waimeha subdivision (around Ngati Rarua St). It has a temporary stormwater capacity function and can be removed when the flood capacity of Saxton Creek is increased. It is dry most of the time.

   The gravel trap in Stage 2 of the works is not part of the current applications; nor is it affected by this application, and we consider it is not a matter relevant to the assessment of the current applications. For the record fish pass opportunities at the Stage 2 gravel trap are excellent since installation of a state of the art fish ramp.

10. How will natural form and character (e.g. channel meander and pool/riffle complexes) be implemented and maintained, particularly in the straightened and shifted channel realignment?

    A natural form is the original form of an object in nature. The Stage 3 area was a swamp podocarp/flax wetland prior to the issue of suburban 50 acre farm sections in Waimea East in 1842. The wetland was drained to make way for pastoral farming and water directed to a low lying straightened ditch. For 175 years Saxton Creek has been used by adjacent landowners and local authorities to divert flood waters to the Waimea Inlet. Channel meanders and pool and riffle complexes changed frequently by both acts of nature and humans. Much of the existing creek within Stage 3 currently lies within private property and access is restricted. As a result, recent NCC's non-regulatory initiatives including fish barrier remediations and Nelson Nature or Stoke Streams Rescue, which aim to improve stream health and riparian habitat in streams, have not impacted the status quo within the Stage 3 reach.

    What has and presently exists within Saxton Creek will change with the Stage 3 proposal. This proposal to drain floodwaters away from adjacent land will be an improvement over past attempts to achieve the same outcome. Maintaining all existing stream characteristics will not be possible because Saxton Creek will be replaced with the proposed channel realignment. There will be opportunities to provide meanders, pools and habitat within the new channel realignment as described in other sections. Some existing habitats, such as large deep pools and hyporheic habitat will not possible to implement with this proposal, at least not within the short term.

11. Please provide consideration of the loss of hyporheic habitat and measures to mitigate loss i.e. reinstatement of gravels within the bed of the channel and depth/length of gravel bed reinstated.

Because of the closed cell geotextile placed on the base of the low flow channel there are limited interstitial habitat opportunities that can be penetrated by aquatic fauna. The loss of interstitial habitat can be partly offset by filling rock voids within the low flow channel with river run gravel and cobble. This should be undertaken along the entire length of the Stage 3 low flow channel. This will not however provide for depths that would be observed in natural stream beds or if the geotextile cloth was not applied (>1m).

Over time more gravel and sediment will be deposited throughout the Stage 3 low flow channel and the hyporheic habitat opportunities will improve, but to what extent is unknown.

12. What planting could be undertaken and maintained (i.e. reinstated after 5% AEP flows) within the low flow channel to maintain ecological habitat and better provide shade and allochthonous inputs of woody debris and terrestrial food items?

Within the low flow channel there are two main constraints, firstly that the plants need to be able to fold over in flood events and secondly that they can survive in the rock-rap stone environment (minimal physical space for root growth). Plants such as groundcover coprosma, Juncus and Carex are suitable species for these conditions. The proposed Carex and Juncus are to be located immediately along the edges of the low flow channel, providing shade and minor debris to support terrestrial food requirements.

The Ecologist and Contractor will work closely together during construction to form pools and planting will be focused in these areas to provide overhang and shade.

13. How will Manning's Roughness coefficients change if planting is closer to the low flow channel?

Planting down to the low flow channel would increase the Manning's Roughness Coefficients of the channel and as a result increase the depth of the design flood water level. Only 20% of the proposed channel length could handle the additional water depth without reducing the design freeboard. The remaining 80% of the channel length would have less than desired freeboard, which would result in a deeper flood water depth within the flood channel. While the flood water would be higher, it is within the design freeboard and therefore it is still expected to be contained within the overall flood (trapezoidal) channel. Increased vegetation (reducing the freeboard) in the design channel will make the channel more prone to debris build up and resulting blockages in lower (less than the Q100 design) frequency events.

The revisions to the planting proposal to incorporate more plants in the low flow channel are considered acceptable, as a compromise, but no further planting will be possible. If the plantings around the low-flow channel do adversely affect the design flow capacity of the creek, once the large trees mature and provide effective shade to the low flow channel, some of the plantings within the base of the rock lined channel could be removed to restore design capacity.

14. What are the implications of changing the channel planting on flood capacity of the design channel and the already authorised works upstream and downstream of the application area?

See Question 13. The increase in water level, resulting from increasing the Manning's Roughness Coefficient in Stage 3, will result in the same increase in the bottom 10-15m of the Stage 2 works. There will be no effect on the Stage 1 works.

15. Will streamside planting effectively shade the low flow meandering channel within the trapezoidal 5% AEP channel design?

A substantial review of the planting plan has been undertaken, and attached to this letter is a new set of plans - Revised 'Landscape Plans & Planting Establishment Plan' Revision 4, dated 19/04/18. ***These are to replace the plans provided as Appendix 3 in the consent application as lodged.***

The key changes in the new landscape and planting plan are:

- *Carex and Juncus are planted within the rock work either side and close to edge of the low flow channel.*

- *An additional 20% of tree planting is planned along the eastern creek boundary to provide additional shade (including 28 deciduous and 8 native trees).*
- *There is a higher percentage of faster growing tree and shrub species. Included in this is use of fast growing tree lucerne to provide shade in the earlier years. As discussed below these will eventually be removed when native species and other shade becomes established.*
- *There is an increase in the size of tree being planted – from PB8/10 to PB18 grade.*

As regards shading of the low flow channel:

- *The proposed Carex and Juncus edging the low flow channel will provide localised shading of the water.*
- *Morning and some mid-day shading of the wider flood channel (including the low flow channel) will come from the eastern boundary native trees and shrub planting mix, with plants reaching heights of 3-4m in 5 years and 4 - 12m mature heights depending on species. Refer to planting schedule for details on individual estimated tree heights after 5 years and at maturity. (Height information based on Southernwoods Nursery web site).*
- *Afternoon shading of the flood channel (including the low flow channel) will come from a mix of fast growing, medium sized native trees and fast growing deciduous trees. Native trees will reach heights of 3-4m in 5 years and 10-12m at maturity, while the selected deciduous trees will reach 4-5m height in 5 years and 10-20m height at maturity.*
- *The combination of planting mentioned above will effectively shade the low flow channel.*

16. How long will it take for the proposed mature tree plantings to establish and provide effective shading and if they will provide effective shade how will shade, temperature and habitat values be provided until the proposed plantings have matured?

- *The Carex and Juncus beside the low flow channel will provide some shading to the water immediately and effective shading within 1-2 years.*
- *Faster growing native tree species have been increased in percentage and located along both bank edges to minimize the time impact while plantings establish. Species such as plagianthus, pittosporum, and kānuka.*
- *We expect the mature trees to establish within the first season and the general growth rates of the shrubs and trees will be approximately 300-500mm per year once established. Root trainer plants have been recommended for the bulk of the planting as our experience has been that smaller grade plants tend to establish quicker and growth is stronger long term.*
- *In addition, to provide shade while some of the slower growing trees are maturing, it is proposed to plant tree lucerne along the top of the rock protection edge on both sides of the creek at approximately 10m centres. As the other trees grow, the tree lucerne will be pruned accordingly, and in the longer term, once other trees provide adequate shading, the tree lucerne will be removed. The tree lucerne will provide effective shade within 1.5 - 2 years of planting.*

17. How will afternoon shading to the stream be provided in the long term?

To improve afternoon shading the following changes have been made:

- *The footpath has been relocated in several locations to allow a wider area for additional specimen tree planting adjoining the channel. This will provide greater coverage of afternoon shading to the creek.*
- *Originally 18 deciduous and 160 native trees were proposed along the western creek edge. We have increased tree planting by approximately 20% with an additional 28 deciduous trees and 8 native trees.*
- *A selection of faster growing specimen trees have been included such as alder, pittosporum and kānuka trees to provide shade to the creek sooner. Alder, sweet gum and pin oaks will reach heights of 4-5m in 5 years and at maturity they span 10-20m.*
- *Specimen trees have been increased from 8/10L to PB18 grades to add some extra height at planting. Larger more mature tree grades were considered but experience has shown that these larger grade trees tend not to perform well in this type of environment.*

- *Where pools can be established, these areas will be targeted with shade trees and Carex species to provide shade and overhang. This will be coordinated on-site with the Contractor and Ecologist.*

18. What are the plans to restore wetland habitat, as recommended in the Cultural Effects Assessment?

As noted on page 23 of the Annexure A of the application, there is no room within the esplanade reserve established by the Consent Order to create a wetland, but the Stage 1 development plans included creation of a wetland area within a currently damp corner of Saxton Field. The revised Landscape Plans & Planting Establishment Plan', revision 4, attached to this letter give more detail on the wetland. The area is shown on Sheet 05. The planting palette is on Sheet 04, and is as follows:

WETLAND

Botanical Name	Common Name	Mature height	H. after 5 yrs	Plant Size	Planting Centres (metre)	Percentage Mix of species
Carex secta	Pūkio			RT	1	10%
Carex virgata	Pūkio			RT	1	5%
Carex geminata	Pūkio			RT	1	5%
Austroderia richardii	Toe toe			RT	1	5%
Cyperus ustulatus				RT	1	5%
Juncus edgariae	Common rush			RT	1	5%
Juncus pallidus				RT	1	5%
Hebe stricta var Atkinsonii	Koromiko			RT	1	2%
Phormium tenax				RT	1	10%
						52%

19. Please provide details of the method of Rapid Habitat Assessment and the data underlying the assessment scores pre and post application.

All three stages (3A, 3C & 3B) of Stage 3 underwent a RHQA. The habitat varied within all three stages so additional RHQAs were conducted. There were two assessments taken in 3A, three in 3C and two in 3B. In total seven RHQA's were undertaken and each habitat type is described in the report.

Within each of the three stages the RHQA's were combined and averaged to provide a numerical result. For example, the two scores in 3A was 41/100 and 43/100. So the number 42 is illustrated as the result on the bar graph.

The RHQAs were assessed by three staff members after electric fishing each of the stages A, C and B. The assessment is subjective. Each staff member provided a score for the ten stream habitat parameters on each assessment and these scores were averaged. In some instances, the various habitat types were re-visited to review a particular parameter.

20. Please provide details (or volunteered consent conditions) detailing how erosion and sedimentation controls will be implemented by the contractor during works, to minimise sediment discharge to the stream and ultimately Waimeha Inlet.

The application in Annexure A, Section 6, contains the conditions volunteered by the applicant, as follows:

Under the Land Use application:

Condition 6 is that prior to works starting a Dust, Erosion and Sedimentation Plan is lodged and that the Manager Consents most approve it, and that the plan be implemented.

Under proposed condition 5 the works are to be supervised by a suitably qualified engineer experienced in civil engineering and river control works, and under condition 4 a suitably qualified and experienced freshwater ecologist will advise the engineer, and through them, the contractor.

Condition 10 requires that all work is carried out in such a manner as to minimise sedimentation and contamination of the stream.

Condition 21 relates to rehabilitation and planting of the working areas and stream bed.

Under the application to discharge stormwater during construction:

Condition 3 relates to the Dust, Erosion and Sedimentation Plan, and condition 2 to the engagement of an Ecologist, while condition 7 requires that the Ecologist inspect the sediment controls to ensure they function properly.

The contractor who will undertake the work on Stage 3 has constructed the earlier stages of the flood upgrade works on Saxton Creek. I have checked with the Council's Monitoring Officer (Ryno Botha) who has confirmed that he has had no issues with that contractor's management of erosion or sedimentation on those earlier stages.

21. Please provide an assessment on cumulative effects in native fish and ecosystem health of these applications in conjunction with Stages 1 and 2 works on the Saxton Creek catchment and the increasing impervious cover from residual land use.

As regards increasing impervious cover in the catchment, the applications do <u>not</u> involve consent for the discharge from changing land use (e.g. due changes in volumes or quality from house roofs and paved areas). Those matters have been addressed as part of the subdivision consents at the time of development, and/or they are within the existing global discharge consent RM075499, held by Council for its discharge of stormwater to freshwater. Consent RM075499 provides for existing and new discharges to streams from the Council's reticulated stormwater network and are not matters that need to be assessed or considered in this consent application.

Prior to channel capacity upgrade works on Stage 2 Saxton Creek was managed as a straightened drain by adjacent landowners and local authorities. Farm and forestry management in the uplands combined with dairy farming, horticultural and residential development land use in the mid and lower reaches resulted in high sedimentation and E.coli levels. Gravel mobilization consistently minimized channel capacity resulting in the flooding of property and infrastructure. Numerous fish passage barriers existed from Saxton Field to the Champion Road Bridge. Bank erosion was frequent as a result of cattle access, the removal of bank vegetation by adjacent landowners and frequent floods, especially the 1 in 100 year and 1 in 150 year occurrences in December 2011 and April 2013. Natural summer low flow conditions have resulted in elevated water temperatures and reaches of dry exposed creek bed.

Despite these human-induced and natural events Saxton Creek contains a native fish population where recruitment success is high being in close proximity to the Waimea Inlet.

Since the completion of Stage 2 and Stage 1, the Saxon Creek environment has undergone significant changes. Fish passage barriers have been removed repaired and improved, providing for migration opportunities from the sea to the uplands. Construction of a gravel trap in Stage 2 will prevent extensive downstream accumulations, reducing flood risks and habitat destruction. Channel widening will also reduce the devastating effects of flooding in Saxton Creek. Increasing the water storage capacity of the former Daelyn's irrigation dam (Saxton Pond) and diverting Saxton Creek through the pond provides habitat opportunities for migrating and resident fish. Eventually new plantings will provide improved spawning areas for inanga and bank stabilisation. Some planted areas will remove overland sediment discharge and provide stream shading. Willow trees along with their root mats and the invasive pampas grass has been removed, and more will be as part of the Stage 3 works. Stock access to Saxton Creek has now been excluded.

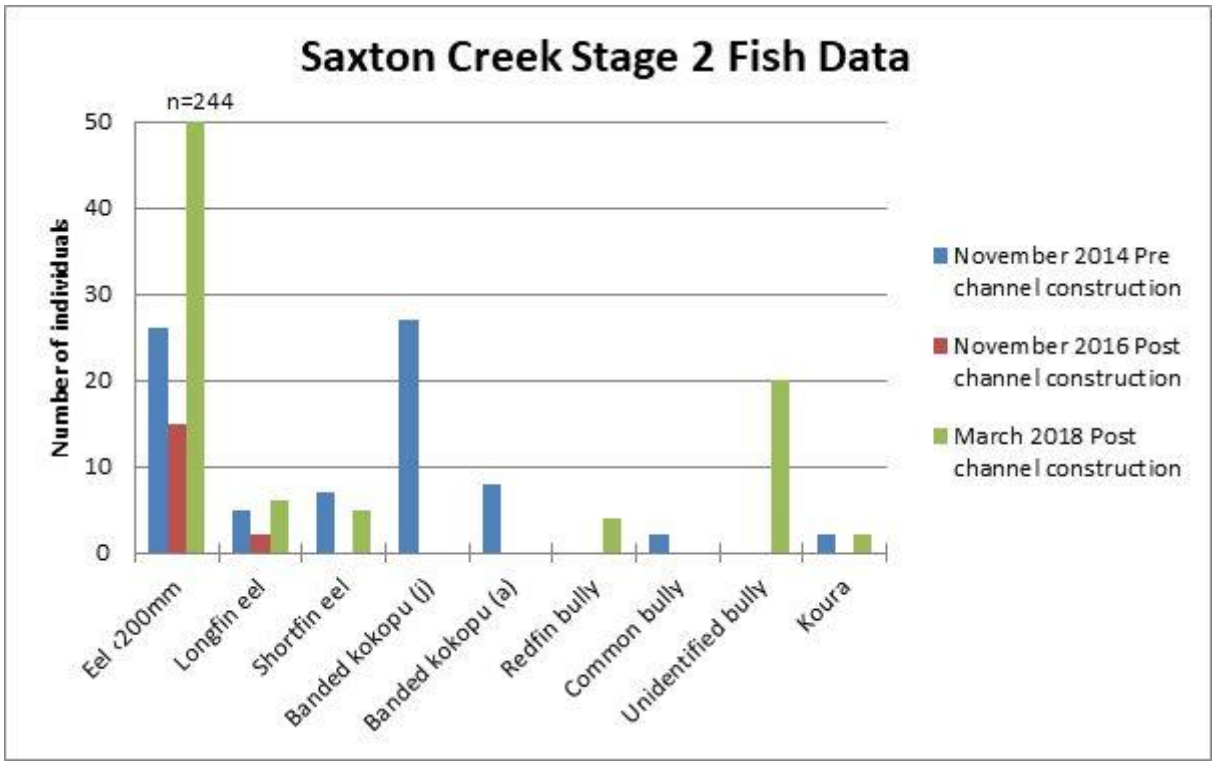
The use of rock, both within the channel and banks in Stages 2 and 1, will increase the water temperatures of Saxton Creek during the summer months until planted vegetation is established. The use of geotextile cloth on the stream bed will reduce the hyporheic habitat until such time that bed material mobilises and settles from upstream sources. With the exceptions of Saxton Pond and the gravel trap large pool habitat has been lost. Stream shading by invasive plantings, introduced and native plants has been lost to channel widening.

Native Fish

It is difficult to establish the cumulative effect on native fish in conjunction with Stages 2 and 1 because there is not a lot of baseline information since construction.

Eels

Stage 2 downstream of the Riding for Disabled was single passed electric fished in November 2014 (pre-construction), November 2016 (immediately after channel construction) and March 2018 (post-construction). The results are shown below:



Prior to construction 26 eels <200mm were observed. In 2018 the eel population was 244. While these surveys are at different times of the year the results do show that the Stage 2 channel capacity works provides habitat for small eels. Adult eel numbers between pre and post construction (2018) have not changed, despite being larger pool habitat available prior to construction.

From observation, channel capacity upgrades and rock protection works appear to favour eel populations. Orphanage Creek, from Saxton Road to Suffolk Road was rock lined approximately 25 years ago. It contains some of the largest densities of longfin and shortfin eels within the NCC Region. Reservoir Creek (with Tasman District) from Templemore Drive to college corner was rock lined 8 years ago and by 2016 longfin eels were abundant (as were inanga and common bully).

With improved fish passage and rock habitat combined with improved water quality and eventual mature plantings I would expect the eel density to increase over pre-construction numbers throughout Saxton Creek. Prior to Stage 1 construction Saxton Pond contained approximately 7000 eels. Saxton Pond now has Saxton Creek flowing through it and has been deepened with the removal of 6500m^3 of sediment. Log habitat cribs have been fixed to the bed to create additional habitat. Direct access to the pond is now available from the Waimea Inlet and the same holds true for the eel's food source.

Banded Kokopu

The loss of deep pools with under bank cover and overhanging shade will not have a favourable outcome for banded kokopu adults. This pre-construction habitat was available in Stage 2 and is now absent. In 2014 there were 8 adults captured by electric fishing though it is likely more adults were present at the time. Although Saxton Creek contained other pool habitats downstream of Stage 2, no banded kokopu adults have been observed. Fish passage has now improved with better access to upland habitats where banded

kokopu adults reside. It is not known if habitat structures proposed for Stage 3 will benefit adult banded kokopu. Saxton Pond may provide some opportunity especially at the inlet confluence.

Banded kokopu juveniles were observed immediately following construction of fish passage into Saxton Pond and upstream into the upper limits of Stage 3 following Stage 1 construction. The smaller pool habitat that has and will develop, in addition to improved fish passage, may increase the juvenile population throughout Saxton Creek.

Koaro

Koaro are generally found in fast rocky clear streams that flow through bush. The only adults found in Saxton Creek have been above Stage 2 in the Tasman District. The channel capacity upgrades will not provide for koaro habitats in the short term.

Bullies

Common Bully

Common bullies have historically been found in the lower reaches of Saxton Creek. While the reach along Saxton Pond no longer exists, habitat is still available below the pond. If Templemore Pond on Reservoir Creek is anything to go by, the common bully population in Saxton Pond could become abundant if the fish passage structure can be negotiated. Habitat also exists above the pond in all Stages.

Giant Bully

While rare in Saxton Creek giant bully have been observed in the lower reaches at least on two occasions. The best habitat lies below Saxton Pond that contains undercut banks and rock cover. Giants do not venture far inland from the estuary and the channel capacity works are not expected to influence giant bully numbers to any extent.

Redfin Bully

Redfin Bullies have never been common in Saxton Creek as they prefer faster flows and more cobble rocky substrate. One ripe redfin bully was captured in the reach adjacent to Saxton Pond but this area has now been diverted through Saxton Pond. It is interesting to note the four adults found at Stage 2 in March this year together with 20 unidentified juveniles that were most likely redfin bullies. Given improved fish passage, the ability of this species to climb, the faster flows over the new rocky substrate and natural migration to upstream habitats, I expect redfin bully density to increase throughout Saxton Creek as a result of all three Stage developments.

Inanga

Inanga have been common in the lower and lower mid reaches of Saxton Creek at least prior to construction of Stage 1. Saxton Creek joins the estuary and is slow flowing with a low gradient which provides ideal habitat. Fish passage barriers would have limited upstream migration except when water levels were receding after floods.

Spawning occurs upstream of Main Road Stoke but suitable plant platforms had historically limited the potential. Over the past two seasons straw bales have been strategically placed during the spawning season until the Stage 1 plantings of tall fescue have matured along the engineered gradient banks within and upstream of the tidal wedge (photo below).

The Saxton Creek bed from Main Road Stoke to the Saxton Pond fish pass was relatively undisturbed during Stage 1 construction but all of the riparian vegetation was removed. This entire area has now been extensively planted with natives and will provide ideal habitat for inanga.

Inanga were observed within days of installing baffles onto the fish passage structure into Saxton Pond (electric fishing into a stop net along the baffles) during Stage 1 construction. There are good habitat opportunities in the pond itself and the inlet reach to Stage 3. As previously mentioned, with the completion of these proposed works there will be no fish passage issues from the sea to the top of Stage 2 and beyond into the uplands.

Smelt

Smelt have not been recorded further upstream than the intake for the old Daelyn Pond, a reach that has been decommissioned during Stage 1 construction. This reach has been replaced with Saxton Pond and the inlet reach that feeds it.

Smelt favour slow moving water and open areas along the margins of dams and lakes. While most of their life is at sea they have been known to migrate long distances upstream in low gradient systems and landlocked populations exist. While habitat exists below Saxton Pond the fish pass may be negotiated by smelt in late summer as flows are often very low. In this event both pond and inlet will offer shoaling habitat for smelt.

22. Please provide more detail on the available spawning habitat pre and post application for the indigenous fish species found in Saxton Creek, including any relevant spawning period or migration exclusions in consent conditions.

Within the existing Stage 3 reaches spawning habitat may be available for redfin and common bullies, both spring and early summer spawners. Cobble and rock habitat is available although some of these areas can contain large sediment deposits. In any event existing habitat would be lost and any fish salvaged would be transferred to sections of Saxton Creek outside of the Stage 3 construction zone.

Proposed consent conditions consider the migration and spawning habitats of native fish, including the management of sediment discharge to downstream habitats:

- *The Consent Holder shall engage a suitably qualified and experienced freshwater ecologist (the Ecologist) to provide advice relating to the timing and prioritisation of operations to minimise adverse effects on aquatic flora and fauna including observing operations and providing best practice management during any work in the bed of Saxton Creek, and during river bank protection works associated with this consent.*

- *No works shall be undertaken between 1 April and 15 August in koaro and kokopu spawning areas unless the Ecologist has determined that no spawning habitats exist or that sedimentation will not pose a risk to any spawning area.*

- *The Consent Holder shall ensure that the works are carried out in such a manner as to minimise sedimentation and contamination of the streams.*

- *The Ecologist shall inspect the sediment controls, any coffer dams and temporary fish barriers regularly to ensure they are functioning properly*

- *Fish salvage and transfer prior to and during construction work shall occur where required. The Ecologist shall monitor for the presence of migrating fish both prior to and during construction and shall make provision to bypass the construction site where necessary*

- *If any reach is bypass pumped during the months of September to December (inclusive), the Ecologist shall determine, on a daily basis, if fish passage should be reinstated (note to protect migrating fish)*

- *The Ecologist will be on site during the de-watering of any part of the stream bed during construction, and will manage and supervise fish salvage activities throughout the dewatering period until fish passage is restored.*

- *At the completion of the works, fish passage shall be reinstated and every attempt should be made to improve fish passage where practicable.*

- *The duration of stream diversions shall take into account advice from the Ecologist to ensure fish movement is not adversely compromised.*

- *The discharge shall not, after reasonable mixing, give rise to any of the following effects in the receiving waters: (a) The production of any conspicuous oil or grease films, scums or foams, floatable or suspended materials; (b) Any conspicuous change of colour or visual clarity; (c) Any emission of objectionable odour; or (d) Any significant adverse effects on aquatic life.*

23. Please provide more detail on the effects of the applications on the freshwater values identified for the Saxton Creek through the freshwater and iwi working group draft Nelson Plan development and how the proposed activities will be consistent with NCC non-regulatory programmes and biodiversity strategies for improvement of stream health.

    The information referred to is not in the public realm as far as we are aware. Moreover, this material does not have any statutory status. The applications lodged must be assessed against the operative Regional Policy Statement and the operative Nelson Resource Management Plan. In my view, a consent application cannot be assessed against the work of a working group for a plan that is not yet at the draft stage, and which has not been publicly notified.

Regards

David Jackson
Principal Planner

Appendix A: Assessment of Environmental Effects – Noise

This is a supplement to the AEE of the application, and replaces the second paragraph in section 3.4 of Annexure A.

Construction Noise

The construction activity will comply with construction noise standard NZS 6803:1999, and we offer that as an additional condition of consent. The hours of operation will be limited to 7am to 6pm Monday to Friday, and 9am to 2pm Saturday, to minimise effects on neighbours. An exception to this is when pumps are used for dewatering or bypass pumping of the stream, when these will need to run overnight. A condition is offered of a hay bale noise bund around the pumps to attenuate night time noise if the pump generator is within 30m of any residential dwelling. This approach has been used successfully on earlier stages of work on Saxton Creek.

Other sources of noise during construction activity will be chainsaws when removing trees and vegetation, excavators, loaders and trucks, including concrete trucks. A crane will be involved in the building of the two bridges but the noise from these is low. There will be no loud percussive noise from construction – no blasting and no pile driving. The loudest noise is expected to be unloading the rock rip rap from the trucks. This will occur towards the end of the construction and might amount to one truck per hour on average. The activity will be spread along the length of the construction work and will not be concentrated in one location.

The work will take place in the mix of land zoned Residential, Rural, and Rural (Higher Density Small Holdings). The residential land is on the west side of the creek, and most of the land affected is currently in rural residential use. Some of the land next to Stage 3A has been developed for housing recently (Ngati Rarua St, and Mako St), and houses are currently being constructed along Daelyn Drive, bordering the lower reaches of Stage 3B (between Hill St and Saxton Field), with some of these occupied and a few vacant sections on the street yet to be developed.

The land on the eastern side of the creek is Rural (Higher Density Small Holdings) and Rural Zone, with a section of creek near the end of Hill St being Rural on both banks.

The houses at 29 Mako St and 22 Ngati Rarua St are the closest to the proposed extension of Ngati Rarua St through the road reserve (CFR 698929), and into 25 Hill Street, where the bridge and turning head on Ngati Rarua St will be constructed. Construction of a road is a permitted activity in the NRMP, and pursuant to section 104(2) of the RMA, Council “may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect”. Subdivision and development is an expected part of residential activity which will occur with bare residential land, and the works on the road and the bridge are of a nature of what could reasonably be expected in a new and developing residential area.

The noise from chainsaws and machinery is also typical of the current rural and rural residential environment, but the extent of the activity will be more than what would normally be expected in such locations from farming activity. Equally, within the Residential Zone there is currently a high and ongoing level of house construction occurring in the new subdivisions, so there will be some acceptance that this currently is an active working environment without normal established residential amenity.

It is accepted that the noise from construction on the creek itself will be more than what might expected both in a residential and rural area, mainly because of its duration.

The hours of work offered in the conditions are designed to avoid work occurring during sensitive times. The hours of operation necessarily are a compromise between avoiding evening and night times, while also ensuring that the work is completed in the shortest time possible: that is, to avoid the construction works being drawn out over a longer period.

With the nature of the work and the machinery used we are confident that noise levels will comply with the construction noise standard NZS 6803:1999. Compliance with the standard will ensure that construction

noise impacts will be no more than minor. The Council Monitoring Officer has confirmed that no noise complaints have been received in relation to works in the earlier stages of re-development of Saxton Creek by Nelson City Council.

There will be noise from truck movements on the road network, but noise from vehicles on road are regulated by the Land Transport Act and not matters for consideration under the RMA.