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18 April 2019

Attn: Sanjay Bangs and Andrew Miller
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BUN60334952, LUC60334953 and WAT60334954
IZ027500-709 Grey Lynn Tunnel

Grey Lynn Tunnel: Response to s92 Request for Further Information in relation to Watercare's Notice of Requirement and Resource Consent Application

Dear Sanjay and Andrew,

Further to your letter dated 21 March 2019 requesting further information with respect to the Notice of Requirement and resource consent applications BUN60334952, LUC60334953 and WAT60334954 by Watercare, we provide the following:

NOR1 *Please provide tracking assessments to demonstrate that vehicular access and egress to the properties on the opposite side of Tawariki Street at 35 to 41 Tawariki Street (particularly 41 Tawariki Street) will be maintained during construction. (Note: see also RC21)*

Please refer to Attachment A which contains a tracking assessment prepared by Commute.

NOR2 *Please provide further detail on how rubbish collection from 35-41 Tawariki Street will occur during construction. Please provide further details on where trucks (including rubbish trucks) will turn to access 37 to 41 Tawariki Street. (Note: see also RC22 and RC27)*

Refer to Attachment A.

NOR3 *Please provide tracking for typical construction trucks (large rigid truck) and semi-trailer trucks to demonstrate how these will access the site. The tracking should identify where permanent No Stopping At All Time markings are required on Tawariki Street in order for typical dump trucks associated with construction and maintenance to enter and leave the site.*

Refer to Attachment A.

NOR4 *Please provide further assessment and information to establish the scale of parking related effects and how any potential effects would be mitigated (Auckland Transport (AT))*

Refer to Attachment A.

NOR5 *Please provide more detail on the effects of construction on pedestrian movement in the local area, including how pedestrian access and safety will be maintained throughout the immediate area during temporary works. (Flow & AT)*

Refer to Attachment A.

NOR6 *Please confirm whether the trip generation assumptions set out on page 5 of Appendix A to the ITA take into account the construction traffic required for the removal of existing dwellings and site clearance for subsequent applications. (Note: see also RC24)*

Refer to Attachment A.

NOR7 *Please clarify trip generation assumptions related to other heavy load vehicles not accounted for, and labour related trips. (AT)*

Refer to Attachment A.

NOR8 *Please confirm how any transport related effects have been addressed in relation to the Western Springs shaft site as part of the Central Interceptor designation. (AT)*

The transport related effects in relation to the Western Springs shaft site were fully assessed as part of the Central Interceptor designation and consents. As stated in Section 2.2 of the AEE, the Project will not involve any aboveground works at the Western Springs construction site. For instance, the Tunnel Boring Machine (TBM) will be launched at the May Road construction site, passing beneath the Western Springs construction site and continuing northwards to the proposed Tawariki Street Shaft Site. No spoil will be removed at the Western Springs shaft site. No additional works are required at the Western Springs shaft site beyond those required for the construction of the Central Interceptor. As such, there will be no transport related effects in relation to the Western Springs construction site.

NOR9 *Please provide further detail around the expected origin and destination of the primary construction related traffic, e.g. for spoil removal.*

This detail will be determined at the detailed design and construction stage and will be addressed in the Traffic Management Plan ("TMP" – proposed condition 5). The proposed routes for heavy construction vehicles to and from the State Highway network have been identified in Section 6.7 of the AEE (see in particular Figure 6.1) and the Traffic Impact Assessment by Commute (Appendix K of the AEE). It was concluded that the Project will have minimal traffic effects to the function, capacity and safety of the surrounding transport network.

NOR10 *Figure 2 Roading environment in the ITA appears to have incorrectly identified the location of the traffic count site at Richmond Road / Mokau Street (Figure 4). Please clarify the location of the traffic count site and update Figure 2 accordingly.*

Refer to Attachment A.

NOR11 *Please confirm the following:*

a. the estimated depth of the proposed tunnels at the points where the tunnel crosses beneath existing roads and AT assets (designated car park reference ID518) and to confirm if there are any effects on the on-going use and structure of these roads and car park; and

b. if there are any effects on the on-going use and structure of these roads and car park. (AT)

The estimated depth of the proposed tunnels beneath the existing roads and the designated car park (ID518) at Western Springs is provided in Attachment K. As confirmed by MJA, the Project will not have any vibration or settlement effects on the on-going use and structure of the existing roads and the car park at Western Springs (refer to Attachment G).

NOR12 *Please provide additional information regarding the final surface treatment for all proposed built elements above ground (ventilation building with air stack and concrete retaining wall to the east) in order to demonstrate how the proposal will be seen within the surrounding environment.*

Please refer to Attachment M which includes the landscape plan, cross sections and visualisation prepared for the Project.

NOR13 *Please provide information on the proposed landscaping and planting proposals.*

Refer to Attachment M.

NOR14 *Please provide a cross section through the site and properties to the south.*

Refer to Attachment M.

NOR15 *Please clarify why Condition 4.1 relating to operational noise limits does not address noise at the boundary of sites zoned Special Purpose – School, given that the proposal is on land adjacent to school sites subject to this zoning.*

Watercare proposes to amend proposed condition 4.1 for the NOR as follows:

> The noise arising from any operational activities undertaken on the designated land, shall not exceed the following noise limits when measured at or within the boundary of any site zoned as follows:

Residential	
Time	Noise Limit*
0700-2200 hours	50 dB L_{Aeq}
2200-0700 hours	40 dB L_{Aeq} 75 dB L_{Amax}
Special Purpose – School	
Time	Noise Limit
Monday to Saturday 0700-2200 hours	55 dB L_{Aeq}
Sunday 0900-1800 hours	
All other times	40 dB L_{Aeq} 75 dB L_{Amax}
Business	
Time	Noise Limit
At all times	60 dB L_{Aeq}

*Notes:

(1) These noise limits relate to noise generated by the normal operation of permanent works associated with the Project and do not apply to short term maintenance activities.

(2) Noise levels shall be measured and assessed in accordance with New Zealand Standards NZS6801:2008 Acoustics - Measurement of Environmental Sound and NZS6801:2008 Acoustics - Environmental Noise.

Please also refer to Attachment F for additional comments provided by Marshall Day.

NOR16 *Please clarify that the reference to 'each CNVMP' given that only one CNVMP is required to be prepared and can be updated when necessary (as a 'living document').*

Given that the Project involves 2 stages (Stage 1 – main shaft, chambers and tunnel, and Stage 2 – secondary shaft as stated in Section 3 of the AEE) a CNVMP is proposed to be prepared for each stage.

NOR17 *Please explain the wording of Condition 3.6, which refers to an assessment of at risk buildings during and after completion of works in the CNVMP.*

Watercare proposes to amend proposed condition 3.6 (b) for the NOR as follows:

b) preparation of building condition reports on the LDS Church on Surrey Crescent Street, the government buildings near Richmond Road and residences at 30, 2/30, 32, 34, 38 Sackville Street and residences at 35, 37, 39, 41 and 42 Tawariki Street ~~'at risk' buildings~~ prior to, during and after completion of works~~, where for the purposes of this condition an 'at risk' building is one at which the levels in the German Standard DIN4150-3: 1999 are likely to be approached or exceeded~~;

NOR18 *Please provide a copy of Council's Global Tree Management Consent, as referenced in paragraph 3.9, page 7 of the Assessment of Arboricultural Effects prepared by Greenscene NZ Ltd and dated 20th February 2019 ('Arborist report').*

Please refer to Attachment L.

NOR19 *Please provide a copy of the Arboricultural Assessment report prepared by Greenscene NZ Limited, dated 9th November 2018.*

Refer to Attachment L.

NOR20 *Please explain the reasoning behind Conditions 11.1 and 11.2 for the NoR relating to discovery of archaeological material, and clarify why these do not align with the Accidental Discovery Rule in E11.6.1 of the AUP(OP).*

Watercare is seeking to align the conditions of the Grey Lynn Tunnel with the existing conditions imposed on the Central Interceptor, to the greatest extent possible. Conditions 11.1 and 11.2 replicate the requirement on Central Interceptor. However, these conditions pre-date the AUP(OP) and it is appropriate to update the wording to reflect the AUP(OP).

Watercare proposes to replace proposed conditions 11.1 and 11.2 for the NOR with the condition below:

If any archaeological material, including human remains are exposed during site work then the Accidental Discovery Protocol according to Standard E12.6.1 of the Auckland Unitary Plan shall apply.

NOR21 *Please clarify how damage caused during construction at the Tawariki Shaft Site will be addressed by the designation.*

As pointed out in the explanation of this question, any damage to the road reserve associated with construction works at the shaft site will be addressed under proposed condition 5.4 proposed in the NoR and the Corridor Access Request (CAR) process with AT. Any damage to the existing network utility services will be addressed under proposed condition 2.2(i) by managing works which directly affect or are located in close proximity to existing network utility services. All the existing buildings and structures within the shaft site will be removed or demolished prior to the commencement of construction.

NOR22 *Please clarify whether the existing Central Interceptor (CI) designations at the May Road and Western Springs sites provide for additional construction works proposed as part of this Project? Specifically, can you confirm:*

a. That the May Road designation (ID 9466) and associated resource consents provide for the extended construction period of four months (as set out in Section 2.2 of the AEE) required for storage of tunnel segments and spoil removal

b. Whether any changes are required to the Western Springs designation (ID 9466) and associated resource consents due to any changes in the design of this infrastructure associated with this Project?

May Road

The May Road construction site is a Watercare designation (ID 9466) for the “construction, operation and maintenance of wastewater infrastructure”. The Project to construct a wastewater interceptor is consistent with the designation purpose and therefore authorised by the existing designation and associated regional consents, provided that the relevant designation and consent conditions are complied with.

Neither Designation 9466 or the associated resource consents are subject to any specific conditions on the duration of construction or traffic movements. As highlighted in Section 2.2 of the AEE, the effects will not be materially different to those considered in the application material and evidence presented for the CI and the slightly longer construction period i.e. 4 months at the site will be in "general accordance" with the designation and associated resource consents (complying with Condition 1.1). The designation and consents provide for all activities required at May Road to construct both the Central Interceptor and the Grey Lynn Tunnel.

Western Springs

The Project will not involve any aboveground works at the Western Springs construction site. For instance, the TBM will be launched at the May Road construction site, passing beneath the Western Springs construction site and continues northwards to the proposed Tawariki Street Shaft Site. No new shafts or structures are proposed at the Western Springs construction site. No changes are required to the Western Springs designation and associated resource consents.

NOR23 *Please explain why the secondary drop-shaft is intended to be constructed separately to the rest of the works. It appears that to construct everything at once would reduce the total disruption time and also mean that there would only be one (potentially slightly longer) construction period versus two periods of disruption.*

As highlighted in Section 4.2 of the AEE, constructing the Grey Lynn Tunnel as part of the CI construction contract provided the best cost benefit over other servicing options for the same level of overflow frequency reduction. In particular, the same TBM machine used for CI will continue to be used for the Grey Lynn Tunnel and this avoid the need to construct any additional shaft at Western Springs. Therefore, the construction works for the main shaft, chambers and tunnel are programmed to occur at the same time as works for the CI.

The secondary shaft is proposed at the shaft site to enable the connection of future sewers (that are not part of this proposal) from the CSO network. These future sewers are not tied to the CI construction and are programmed for future delivery. The construction timing of the secondary shaft will be aligned with the construction of the future sewers once confirmed.

NOR24 *We note on page 18 of the AEE that a permitted baseline has been arrived on for the ventilation structure in terms of understanding its effects. However for infrastructure there is a stricter baseline under E26.2.5.2. Can you clarify this point and whether this was considered and how this might impact your assessment?*

The only aboveground structure of the Project is the plant and ventilation building within the shaft site. The building will have a footprint of approximately 14m long, 6m wide and 4m high (smaller than a residential house), with an air vent of 5m in total height from ground level (i.e. a metre above roof height) with a flange to allow future extension of up to 8m in total height and approximately 1m in diameter (similar to a chimney). The structures will be set back at least 22m from the road frontage away from the neighbouring residential properties and will be surrounded by the proposed landscaping and planting.

Section 2.5 of the AEE records ventilation facilities as a permitted activity. The question correctly identifies there is no reference to the 2.5m permitted height standard in E26.2.5.2 for ventilation facilities. This omission does not change the level of effects from the proposed structures nor the conclusion of the AEE.

The effects of this structure, including the effects of the air vent at its maximum potential height, have been assessed without reference to a permitted baseline. As concluded in the Landscape and Visual Effects Assessment (Appendix R) and Section 6.2 of the AEE, the structures will constitute a minor element of the view from the adjacent properties and will not be prominent. Any visual and landscape effects will be less than minor. Furthermore, additional landscaping drawings and visualisations are attached to demonstrate that the structures will be visually sensitive to the area.

NOR25 *Please confirm whether lighting, such as security lighting and lighting during construction works, is proposed as part of the Project. (Note: see also RC18)*

The shaft and chamber construction and retrieval of the TBM will be daytime activities and hence do not require lighting. The final connection of live sewers might happen at night time when the flows are low. This is being looked at by the design team and further information will be provided in due course. The final lighting requirements will be determined at the detailed design and construction stage and will be addressed in the Construction Management Plan ("CMP" – proposed condition 2). Sensor lighting for security and safety

purposes is likely to be installed within the shaft site and will be confirmed as part of the CMP and Outline Plan of Works (OPW).

RC1 *Please provide the encumbrance documents referenced on the Record of Title for the college as we are unsure of what/where it relates to? If relevant, please provide an explanation as to what the instrument applies to. We also note that there is a building line restriction on the Records of Title for 44-48 Tawariki Street – can you please clarify where that restriction starts and ends? Will it impact the location of the ventilation structure?*

Please refer to Attachment B for a copy of the encumbrance document (7537296.1) attached to title NA397/195 and the building line restriction (BLR 7442) which applies to 44-48 Tawariki Street. We are not aware of any road widening plans by AT which would employ the building line restriction.

The encumbrance attached to the title of St Paul's College relates to the stormwater detention tanks and system within the school ground. This will not be affected by the Project. BLR 7442 imposes a "no building zone" within 42 feet (12.8m) from the centre-line of Tawariki Street. The plant and ventilation building within the shaft site will set back at least 22m from the road frontage.

RC2 *(Note: see also NOR24) We note on page 18 of the AEE that a baseline has been arrived on for the ventilation structure in terms of understanding its effects. However for infrastructure there is a stricter baseline under E26.2.5.2. Please clarify this point and advise whether this was considered and how this might impact your assessment.*

Refer to NOR24 above. The effects of the ventilation structure have been assessed with no reference to a permitted baseline. The ventilation structure is to be authorised by the designation and does not require a resource consent.

RC3 *Please clarify how Rule E26.6.3.1(A145) applies to this proposal as it relates to network utilities in Special Character Areas. If this rule is relevant, it might result in a change in activity status of the application. Please advise if this was considered in your initial plan check and explain if you are replying on Table E26.2.3.1 in this regard.*

E26.9.3 of the AUP stated that activity table E26.9.3.1 specifies the activity status of land use and development activities **in** the Special Character Areas Overlay – Residential and Business. D18 of the AUP provides a description and intent of this overlay which is to maintain and manage the built form, design and architectural values of building, streetscape qualities and cohesiveness and landscape qualities that define, contribute to, or support the special character of the area. The physical attributes that the overlay seeks to protect all relate to above ground features.

The proposed tunnel traverses the Special Character Areas Overlay – Residential Isthmus A in Grey Lynn where it passes **beneath** the relevant areas. At these locations, the tunnel will have an overburden of at least 22m from the ground. As such, the proposed activity is not **in** the Overlay and no above ground features within the overlay area will be affected. Rule E26.2.3.1 (A49) which provides for underground wastewater pipelines has been applied, as opposed to rule E26.9.3.1 (A145), as it more appropriately captures the proposed activity. This interpretation is consistent with the approach applied and accepted by Council for the CI deviation consent granted in March 2018 i.e. no consent was required under rule E26.9.3.1 (A145).

RC4 *(Note: see also NOR22) It is currently unclear whether there will be works at Western Springs for this project. Is the TBM going to simply carry on northwards after it completes the CI part of the line? Additionally, does the existing RC and designation for CI cover activities that are planned to occur at Western Springs that are needed to connect it to Grey Lynn Interceptor portion (i.e. any new drop-shafts/changes in design required)?*

Refer to NOR8 and NOR22 above.

RC5 *(Note: see also NOR22) We understand that the May Road site for the CI will also provide concrete tunnel linings and will be used to take the spoil away from the Grey Lynn Interceptor. Does the existing RC and designation for CI cover the extended construction period that this will create? The AEE explains this briefly on page 5. Please provide evidence that the designation and RC will allow for this change? We are aware that there might be specific conditions relating to construction times/length etc.*

Refer to NOR22 above.

RC6 *(Note: see also NOR23) We would like understand the reasoning to construct the second drop-shaft at Tawariki Street at a later stage – the AEE states this is for future connections/capacity etc. Please clarify the reasons why this cannot be undertaken concurrently with the rest of the works? On face-value it seems that to construct everything at once would reduce the total disruption time and also mean that there would only be one (potentially slightly longer) construction period versus two periods of disruption.*

Refer to NOR23 above.

RC7 *Please clarify whether Plan Change 14 will impact this proposal. We note that this plan change introduces technical changes and corrections which may impact reasons for consent. Particularly as it relates to E7, E11 and E25 – note that others may be relevant.*

Plan Change 14 does not impact the Project nor the reasons for consent.

RC8 *Please advise if the operation of the 4.5m diameter sewer pipeline (post-construction) will give rise to any noise/vibration effects, particularly for dwellings located at the closest vertical distance above the alignment.*

The proposed tunnel will not give rise to any operational noise or vibration effects as confirmed by Marshall Day (Attachment F) and MJA (Attachment G).

RC9 *Conceptual plant and equipment specifications are provided for construction of the Tawariki Street shafts however in regards to tunnelling, the description is limited to "tunnelling plant". Please advise if further information is available as to the tunnel boring machine likely to be selected for this project and, if predicted regenerated noise levels may change significantly depending on the TBM actually used for tunnelling.*

Refer to Attachment F.

RC10 *Please review paragraphs 6.2.2, 6.2.3 and 6.2.4 of the Vibration Report 'Vibration Assessment of Grey Lynn Tunnel and Tawariki' Rev 2 and confirm that no information is missing. We note that there are large gaps in the text which suggests that aspects of the assessment may have been omitted by mistake. We are uncertain if there is information missing which need to be accounted for in the assessment of effects.*

It was a formatting error only i.e. no text was missing. Please refer to a revised vibration report in Attachment H.

RC11 *Please advise if operation of the 4.5m diameter sewer pipeline will give rise to any vibration effects particularly for dwellings located at the closest vertical distance above the alignment.*

Refer to Attachment G.

RC12 *We note that there will be both noise and vibration infringements at a district level under Chapter E25 for the tunnelling works. This was not identified in the AEE. Please outline whether this has been considered and adopt the relevant reasons for consent? In addition, please clarify how Plan Change 14 will impact this and whether any reasons for consent would arise specifically due to this plan change.*

We confirm that the tunneling work will not meet the night time construction noise limits (Standard E25.6.27(4) and (1)) where the tunnel excavation reaches above 18m below ground level and will not meet the night time vibration limits (Standard E25.6.30 (1)(b)) where the tunnel excavation reaches above 20m below ground level. As such, a land use consent is required for a RD activity under Rule E25.4.1(A1).

The AEE submitted included a comprehensive assessment on the construction noise and vibration effects (Sections 6.8 and 6.9). Any potentially affected persons have been identified and will be contacted prior to the works proceeding. It was concluded by Marshall Day and McMillen Jacobs Associates that any adverse noise and vibration effects will be no more than minor and that the use of a CNVMP and advance communication with the potentially affected residents will address any concerns.

As stated above, Plan Change 14 does not impact the Project nor the reasons for consent.

RC13 *It is recognised that the following information was to be provided as part of the Outline Plan of Works at a further stage, however to understand the level of potential and actual adverse effects in the long term (permanent effects), please provide a conceptual hard and soft landscape plan which clearly indicates the following elements:*

a. Location and details of final surface treatments – concrete, permeable pavement, grass, planting, building coverage, etc.

b. Types of planting, which should include the type of planting, indicated through heights/widths of planting or a conceptual plant palette.

c. Key dimensions should be provided where necessary.

Refer to Attachment M.

RC14 *Please provide a conceptual design for the ventilation plant room and air vent to understand how the structures will be visually sensitive to the Residential – Mixed Housing Urban. This should include precedent imagery and a material and colour palette.*

Refer to Attachment M.

RC15 *Please clearly indicate on the Permanent Works plan the extent of the proposed retaining wall. In addition, precedent imagery of the proposed concrete wall and design would be beneficial, in conjunction with a typical elevation of the wall from the street.*

Refer to Attachment M.

RC16 *Please clarify whether the proposed security fence is to be 1.8 - 2.4m high (as stated within the Landscape and Visual Effects Assessment, Page 9) or 3m high (as stated within the Acoustic/Noise Report, Page 13).*

A 3m high acoustic barrier will be erected according to the Appendix E of the Noise Assessment (Appendix L of the AEE) and a security fence of 1.8-2.4m high will be installed along the rest of the boundary. The acoustic barrier and security fence will be temporary in nature and only required during the construction phase of the Project.

RC17 *Please confirm the location of any permanent fencing (including fall fences) after construction is complete, including the proposed style, height and permeability of fence treatments.*

Refer to Attachment M.

RC18 *Please indicate whether any lighting will be required on site, both temporary and permanent in nature. Please provide a lighting plan illustrating the locations, and types of lighting proposed. This is requested to understand if there are any other elements which may adversely affect neighbours visual amenity, particularly during night time.*

The proposed lighting during the construction phase of the Project is addressed under NOR25 above. A sensor light for security purposes will be attached to the plant and ventilation building within the shaft site and will be subject to the OPW process. No other permanent lighting is proposed.

RC19 *(See also NOR 12-14): Please provide a cross section through the site and properties to the south. Due to the elevated locations of the dwellings to the south, it is considered that a cross section is necessary to better understand views and the scale of relationship. The section(s) should indicate the proposal at time of construction (e.g. security/sound fences, cranes etc.) and at completion (fences, retaining walls, planting, ventilation building).*

Refer to Attachment M.

RC20 *Parking provision: The proposal indicates nine parking spaces will be provided for the site during construction and it is intended reduce that after the tunnel is in operation. Please provide outline how this parking provision would comply/not comply with the AUP (OP).*

Refer to Attachment A.

RC21 *Effects to 35-41 Tawariki Street: The properties opposite the site on Tawariki Street appear to have limited access and insufficient manoeuvring spaces, in particular with 41 Tawariki Street where the designation and construction boundary comes up to the vehicle crossing. While No Stopping At All Time markings are proposed, tracking assessments that demonstrate that vehicular access and egress to these properties is maintained is required prior to confirming the southern boundary of the site extent.*

Refer to Attachment A. We note that this matter is also addressed through NOR1 above.

RC22 *Waste collection: Please provide details on how and where trucks (rubbish trucks) will be manoeuvred along Tawariki Street. Where trucks are required to use residential vehicle*

crossings, these should be upgraded to a higher vehicle crossing standard, such as a commercial vehicle crossing.

Refer to Attachment A.

RC23 *Construction truck volumes: Section 10 and Table 1 of the CTE calculates the construction trip generation in four stages. However, it does not include the initial enabling works for removal of existing dwellings and site clearance for subsequent excavations. Confirmation is required that these works will generate trucks movements within the 82 vehicle movements per day predicted.*

Refer to Attachment A. We note that this matter is also addressed through NOR6 above.

RC24 *Vehicle access: The proposal states that the access design is to be confirmed at detailed design stage. However, its future position might have implications for the neighbouring property at 42 Tawariki Street such as the distance in between vehicle crossings and safety concerns. Please provide confirmation that the proposed vehicle crossing will comply with the AUP (OP) relevant standards, including how the crossing will meet relevant construction standards.*

Refer to Attachment A.

RC25 *Please provide tracking for access into the properties at the eastern end of Tawariki St, directly opposite the site, particularly residents of no.41 reversing out of their property. The residents should not be required to reverse down the eastern section of Tawariki St.*

Refer to Attachment A. We note that this matter is also addressed through NOR1 above.

RC26 *Please show tracking curves for rubbish trucks turning around on Tawariki Street, including how the rubbish trucks will service properties 35-41 Tawariki St.*

Refer to Attachment A. We note that this matter is also addressed through NOR2 above.

RC27 *Please confirm if Tawariki Street is currently used as a pick up/ drop off for St. Paul's College. This will enable us to understand how the construction activities will adversely impact school-related operations better.*

Refer to Attachment A.

RC28 *Please confirm the impact of the works (such as from construction and site works) on the catch-pits at the eastern end of Tawariki Street.*

It is expected some aspects of the existing stormwater system within the road reserve (including catchpits) will need to be diverted, relocated or reconstructed. The impact of these works will be confirmed at the detailed design and construction stage and will be addressed in the Construction Management Plan (proposed condition 2). It should be noted that Watercare have consulted and will continue to communicate with Healthy Waters about the Project, as stated in Section 7.2.2 of the AEE. Healthy Waters support the Project (see letter in Appendix T of the AEE).

RC29 *If a retaining wall is required at the end of Tawariki Street an agreement should be provided by Watercare to AT outlining any maintenance requirements, ownership and responsibilities.*

No retaining wall is proposed within the road reserve. The retaining wall proposed will be located within the school land of St Paul's College which form part of the shaft site.

RC30 *No question.*

RC31 *Please provide further information on the control chamber proposed in the road reserve on Tawariki Street. What is the purpose of it, what are its dimensions, where is it located?*

Detailed information of the control chamber proposed in the road reserve is provided in Section 3.3.1 of the AEE and shown on Drawing 2011933.002 in Appendix E of the AEE. It is an underground chamber containing penstock gates that will be used to control the flows from the existing sewerage system (i.e. Orakei Main) into Grey Lynn Tunnel. This determined its proposed location. The chamber will be approximately 10m long, 5m wide and 11m deep below ground.

RC32 *Please provide specialist ecological comment on any expected terrestrial or freshwater ecological effects associated with the expected groundwater changes as outlined in the Groundwater Effects Assessment, including if necessary any avoidance, remediation or mitigation for these effects.*

Please refer to Attachment C which contains comments from Bioresearches.

RC33 *What is the "typical earthwork equipment and temporary retaining" to be used in the construction of the grit traps? Given the depth of excavation and proximity to the boundary any collapse will damage the neighbouring properties. Please provide a more in-depth construction methodology for these traps, particularly the type of temporary/permanent retaining.*

This is being looked at by the design team and further information will be provided in due course. The final construction methodology will be determined and confirmed at the detailed design and construction stage and will be addressed in the CMP (proposed condition 5).

RC34 *Please describe in more detail of what the treatment of any groundwater/silt-laden water entails.*

This will be determined and confirmed at the detailed design and construction stage and will be addressed in the CMP (proposed condition 5). As stated in Section 3 of the AEE, groundwater pumped out of the excavations at Tawariki Street will be treated to Auckland Council requirements prior to discharge to the stormwater drain. As mentioned above, Watercare have consulted and will continue to communicate with Healthy Waters about the Project. Healthy Waters support the Project (see letter in Appendix T of the AEE).

RC35 *The application for consents describes the construction of the tunnel and the Main and Secondary shafts, together with ancillary structures at the Tawariki Street site including two control chambers and a grit trap. The features at the Tawariki Street are to be installed at substantial depth below both the ground surface and below the ambient groundwater level. The groundwater drawdown effects related to the two shafts have been assessed through Ref. 1 and Ref. 4.*

However, there does not appear to be an assessment of the groundwater drawdown and mechanical settlement effects arising from the ancillary structures in the documents reviewed. The ground settlements arising from the ancillary structures are not presented in Appendix A of the settlement assessment report (Ref. 1).

The Tawariki Street shaft site layout plan (Ref. 8) indicate the proposed control chambers and grit trap will be between 5 m and 13 m depth. The proposed 5 m deep control chamber in the north-western portion of the site is in relatively close proximity to the existing building at 42 Tawariki Street.

Please provide an assessment of the ground settlement effects (due to groundwater drawdown and retaining wall deflections) arising from construction of the ancillary structures planned for the Tawariki Street site.

Refer to Attachment O.

RC36 *Please provide an assessment of the cumulative effects from these structures together with the effects from the two planned shafts.*

Refer to Attachment O.

RC37 *Groundwater inflows to the proposed tunnel are planned to be controlled through lining the tunnel and using an Earth Pressure Balance ("EPB") tunnel boring machine. "The EPB TBM must be able to apply a positive pressure to the tunnel face, balancing the earth and groundwater pressures at all times to effectively control the ground and prevent groundwater inflows into the tunnel" (Ref. 1). On this basis, groundwater inflows and therefore "the potential groundwater impacts of the Grey Lynn Tunnel construction are considered to be negligible." (Ref. 4) The flows into the tunnel have been described as:*

a. "Groundwater inflows through the tunnel lining during construction are expected to be limited to less than 0.5 litres per square metre of tunnel lining per day, which is 13m3 per day for the 1.6km length of the tunnel." (Ref. 5)

b. "Approximately 0.006 L/s per meter of tunnel." (Ref. 4). This equates to approximately 52 m3/day per 100m length of tunnel.

Please clarify what the groundwater inflows to the tunnel at the operational face and along the lined length are expected to be.

Refer to Attachment O.

RC38 *A sub-regional scale model has been developed and used appropriately and acceptably to assess the effects of the proposed Tawariki Street shafts on the surrounding environment. Potential effects on stream baseflows, wetlands, lakes, existing groundwater takes and saline water intrusion assessed in this report. Groundwater drawdown derived from the model documented in Ref. 4 has been used to support the assessment of ground settlement around the Tawariki Street site documented in Ref. 1.*

Please provide cross sections aligned parallel and perpendicular to Tawariki Street showing the geological materials modelled, the static groundwater table and the and the drawn down groundwater table for the construction scenarios considered in the settlement report. The cross sections should focus on the areas within 200 m of the Tawariki Street site.

Refer to Attachment O.

RC39 *Taking into consideration the model structure and cell definition, please provide an assessment of the uncertainty regarding the extent and magnitude of groundwater drawdown within the residual soils and highly weathered ECBF in the area within 200 m of*

the Tawariki Street site. Please take specific account of the groundwater drawdown potentially affecting sites adjacent to the Tawariki Street site.

Refer to Attachment O.

RC40 *Please provide a localised east-west cross section from the groundwater model through the simulated shaft showing the model grid, materials simulated and the boundary conditions applied to the shaft under Scenario 6.*

Refer to Attachment O.

RC41 *Please provide cross sections aligned parallel and perpendicular to Tawariki Street showing the geological materials assessed, the groundwater static water levels and the drawn down groundwater levels cumulative from all of the proposed structures at the Tawariki Street site.*

Please refer to Attachment N for the cross sections prepared by McMillen Jacobs.

RC42 *Please also present the projected ground settlements arising from the groundwater drawdown on the cross sections requested above.*

Refer to Attachment N. The predicted consolidation settlement from drawdown has been plotted, matching the horizontal scale but showing an exaggerated vertical scale as settlement is generally less than 10mm.

RC43 *No Groundwater and Ground Settlement Monitoring and Contingency Plan (GSMCP) in support of the consent application has been provided. This should be provided so that the proposed extent and number of monitoring points can be reviewed and so council can understand how adverse effects will be avoided, remedied and mitigated before the application is limited notified.*

Given that minor changes to the position of the tunnel may occur during detailed design (but still within the sub-surface corridor identified) it would be premature to undertake the development of the GSMCP at this time.

We note that a similar approach to GSMCP timing was undertaken for the Central Interceptor, North Harbour 2 Watermain and Northern Interceptor. There are no circumstances associated with the current Project which would require a different approach, particularly given the minimal effects from ground settlement anticipated.

RC44 *The proposed total settlement limit of 50 mm in condition 3.31 (Ref. 6) is considerably higher than the assessed maximum total settlement of 14 mm. Furthermore, the settlement contours shown in Appendix A of the settlement assessment report (Ref 1) indicates the maximum settlement of 14 mm is expected to occur in the playing fields area of St Paul's College. Buildings on Tawariki Street and Moira Street are shown to be outside the 10 mm settlement contour.*

Given the above, it would be appropriate to impose a total settlement limit consistent with the assessed values (e.g. approximately 15 mm).

As explained in NOR 20, Watercare is seeking to align the conditions of the Grey Lynn Tunnel with the existing conditions imposed on the Central Interceptor, to the greatest extent possible.

The proposed total settlement limit of 50mm was applied for the Central Interceptor, and for the subsequent deviation consent. While considerably higher than the maximum expected settlement, this limit is considered appropriate as no damage to structures will occur provided that this limit is met. There are no circumstances associated with the current Project which would require a more restrictive limit to that imposed on the Central Interceptor, particularly given the minimal effects from ground settlement anticipated and that the structures along the proposed tunnel alignment are no more at risk to settlement than similar structures along the Central Interceptor.

RC45 *The FLAC shaft modelling assumptions presented in Appendix C of Ref. 1 indicate that no relaxation of the MW ECBF rock has been considered. This assumption may underestimate the amount of deflection as rock relaxation is likely to occur immediately after removal of the confining stress from the 2.5 m high lifts, prior to application of the shotcrete.*

The shotcrete is modelled to act as shoring of the MW ECBF rock face from arching effects, rather than just providing protection against ravelling of the rock face. Please comment if this has the potential to underestimate displacement of the shaft wall.

Refer to Attachment I.

RC46 *Please provide calculations for the derived groundwater drawdown induced settlement curves shown on Figure 5-5 (Ref. 1).*

Refer to Attachment I.

RC47 *The predicted shaft wall deflection (Figure 5-4) from the FLAC model shows outward displacement within the MW ECBF rock of about 1.5 to 4.5 mm at 10 to 28 m depth down the shaft. Given that this displacement occurs in the lower portion of the shaft excavation, please comment on the potential for associated ground settlement to occur at a distance back from the shaft wall (rather than immediately behind the shaft).*

Refer to Attachment I.

RC48 *The proposed pre-construction condition surveys (Section 3.10 of Ref. 6) should also include 24 and 26 Sackville Street given the buildings also appear to lie within the gully area founded on Tauranga Group alluvium where the tunnel depth is less than 20 m.*

Watercare agrees and therefore proposes to amend proposed condition 3.10 as follows:

> The Consent Holder shall consult with owners of the LDS Church on Surrey Crescent Street, the government buildings near Richmond Road, 24, 26, 30, 2/30, 32, 34, 38 Sackville Street and 35, 37, 39, 41 and 42 Tawariki Street, and subject to the owner's approval on terms acceptable to the Consent Holder, undertake a detailed pre-construction condition survey of these structures to confirm their existing condition and enable the sensitivity of the existing buildings and structures to any groundwater and ground settlement changes to be accurately determined.

Additional Comments

1. Air Discharge Consent

Further to a query from the Council's Air Quality Specialist (Vaughan Turner), we confirm that the Project will not meet the permitted activity standard in relation to storage volume.

GLT (including the proposed shafts and chambers) will have a total storage volume of approximately 29,000m^3 which is over the 10,000m^3 permitted threshold (Standard E14.6.1.24(1)). As such, an air discharge consent is required for a RD activity under Rule E14.4.1 (A177).

The AEE submitted already included a comprehensive assessment on the construction and operational air quality effects (Section 6.11). Given the very low frequency and intensity of any potential discharges, any adverse effects will be less than minor, and no person is affected. Additional assessment addressing the relevant RD activity assessment criteria (E14.8.2) has been undertaken by Aecom and is provided in Attachment D. The assessment concluded that any air discharge effects associated with the Project will be less than minor.

The conditions in relation to air discharge proposed by Watercare is included in Attachment E.

2. Landscape and Visual Effects on 31 Hukanui Crescent

Please refer to Attachment J for an assessment by Boffa Miskell.

We trust that the above provide sufficient information for the notice of requirement and consent applications to continue to be processed.

Yours sincerely

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Attachments
Attachment A – Transportation Memo by Commute dated 18 April 2019
Attachment B – Encumbrance Document 7537296.1 and BLR 7442
Attachment C – Ecology Memo by Bioresearches dated 28 March 2019
Attachment D – Air Quality Assessment Addendum by Aecom dated 1 April 2019
Attachment E – Proposed Conditions in relation to Air Quality
Attachment F – Noise Memo by Marshall Day Acoustics dated 9 April 2019
Attachment G – Vibration Comments & Responses by MJA dated 5 April 2019
Attachment H – Revised Vibration Report (Fixing Formatting Error Only)
Attachment I – Settlement Comments & Responses by MJA dated 5 April 2019
Attachment J – Memo by Boffa Miskell dated 16 April 2019
Attachment K – Tunnel Depth under Roads
Attachment L – Arborist Memo by Greenscene dated 12 April 2019
Attachment M – Landscape Plan and Visualisation
Attachment N – Cross Sections of Subsurface Profiles at Tawariki Shaft
Attachment O – Groundwater Memo by WWLA dated 17 April 2019