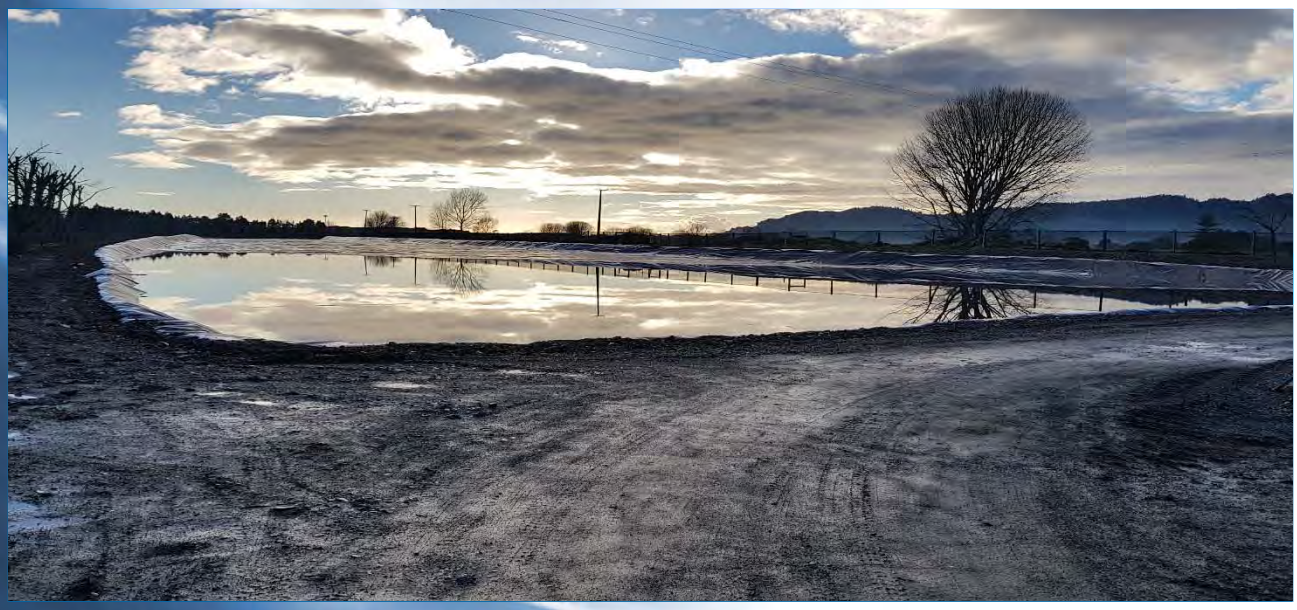

# Bay of Plenty Regional Council

## Kopeopeo Canal Remediation

## CLG Monthly Update Report

August 2018

# Executive summary

Dredging of contaminated sediment into containment site one (CS1) continued throughout August 2018.

Kopeopeo Canal from SH30/Kope Drain Rd to the Orini/Kopeopeo confluence is isolated using the flood control structures (FCS) to ensure only monitored and controlled water discharges from, or flows into, the project area.

Extremely fine-grained sediments disturbed by dredging are proving challenging to measure with the automatic turbidity sensors, especially with inflows of sediment laden water adding to turbidity within the canal. Sampling of turbid canal water discharged at FCS-East has been undertaken in August. Two water samples collected by BOPRC returned Total PCDD/F I-TEQ Upperbound results of 8.1 pg/L at MP8 and 6.92 pg/L at MP10, which related to turbidity values of 50.6 NTU at MP8 and 22.4 NTU at MP10. These results are below the NZ Drinking Water Standards of 30 pg/L and below the newly adopted discharge criterion of 11 pg/L agreed upon by the project team, consent authority, and IM.

The first round of validation testing in Section 5 comprised four sediment samples collected on 13 August 2018. The Total PCDD/F I-TEQ Upperbound results were between 22 and 83 pg/g. Due to a single exceedance (83 pg/g) of the remedial target (60 pg/g), the first 33 m of Section 5 will be redredged in accordance with the EMVP. The 95% UCL for Total PCDD/F I-TEQ Upperbound results from the first 2000 m validated length of the Kopeopeo Canal was 36.41 pg/g, which is below the remedial target of 60 pg/g.

Golder Associates completed a second round of dioxin in groundwater sampling on 24 & 25 August 2018 from the monitoring wells surrounding CS3. Groundwater Total PCDD/F I-TEQ Upperbound results ranged between 4.11 and 8.88 pg/L for CS3. The CS3 results are being used to inform background Total PCDD/F I-TEQ Upperbound concentrations in the groundwater beneath CS3 prior to sediment being deposited in the containment cell. Two rounds of background groundwater sampling have now been completed as required under Consent Condition 36.5.

Three sediment samples were taken from the perimeter drains surrounding CS1 on 13 August 2018. The total PCDD/F I-TEQ Upperbound results ranged between 20 and 23 pg/g. 20 pg/g is the lowest value achievable with this laboratory limit of detection and all samples were below the remedial target of 60 pg/g.

The following report is based upon the observations and commentary by the Independent Monitor Field Observer (Matt James & Pete McGowen) with support from the Independent Monitor (Andrew Kohlrusch). This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 and the assumptions and qualifications contained throughout the Report.

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# Appendices

# 1. Introduction

## 1.1 Introduction

The Kopeopeo Canal is situated on the outskirts of Whakatane, in the Bay of Plenty, New Zealand. The Kopeopeo Canal Remediation Project is a joint venture between Bay of Plenty Regional Council (BOPRC) and central government (MfE) in an effort to restore the canals ability to transfer water and to remediate dioxin contamination caused by historic discharges from an adjacent sawmill. The project area is 5.1 km in length between the Kopeopeo and Orini canal confluence and the intersection of State Highway 30 (SH30) and Kope Drain Road (Appendix A).

The Independent Monitor (Andrew Kohlrusch) and Independent Monitor Field Observer (Matt James) provide independent feedback, assistance, and monitoring to the project management team, contractors working on site, and community through the Community Liaison Group (CLG). The objective of this relationship is to continue to build trust between the Whakatane community and the project team, provide independent technical feedback to the community, and allow the project team to access the extensive technical experience of the IM.

This report is part of the requirements outlined in the Bay of Plenty Regional Council Resource Consent 67173-AP Condition 6 – Independent Monitor.

## 1.2 Purpose

The purpose of the Community Liaison Group (CLG) Monthly Update Report (August 2018) is to provide an independent summary of the progress of the Kopeopeo Canal Remediation Project. The CLG Monthly Update Report (August 2018) is commissioned by Bay of Plenty Regional Council for distribution to the CLG and Whakatane community.

## 1.3 Limitations

This report has been prepared by GHD for Bay of Plenty Regional Council (BOPRC) and may only be used and relied on by Bay of Plenty Regional Council for the purpose agreed between GHD and Bay of Plenty Regional Council as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Bay of Plenty Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

GHD has prepared this report on the basis of information provided by Bay of Plenty Regional Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The IM and IM field observer are not providing commentary or observations on matters related to project team (or subcontractor) health and safety as part of the IM role for the Kopeopeo Canal Remediation Project.

# 2. Project Progress

The following summarises the project events at CS1 during August 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- Oversized material coming off the shakers at CS1 is collected into bulk bags and lifted into the containment cell (Photograph 8 & 9).
- Lime is stored in containers at CS1 prior to being added to the sediment within the geobags (Photograph 10).
- A small (<10 cm) hole was discovered in one of the geobags. Geofabrics Limited were contacted to provide a methodology for undertaking the repair (Photograph 11 & 12).
- Due to heavy sands being picked up by the dredge, the oversized screens on the shakers have sometimes become overwhelmed with material and overflowed into the bunded area around the water treatment plant. This material then has to be manually removed and the area cleaned (Photograph 13).
- A bulk bag was damaged while it was being stored in CS1 and it spilled oversized sediment (Photograph 20). The material was picked up and placed into a new bulk bag.
- The floor of the CS1 cell is nearly entirely covered with 1 to 10 cm of fine sediment. This is being kept inundated with water to avoid airborne dispersal of dioxin-contaminated sediments. This material will be washed down and added to the bags upon the closure of the cell.

The following summarises the events at CS3 during August 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- New shade cloth and fencing was installed at CS3 (Photograph 1).
- A new forestry gate was installed across the main entrance gates to CS3 in response to a vehicle ramming the existing wire mesh gate. Following the installation of the new gate, the area of the stopbank that had been disturbed was covered with clean soil (Photograph 5 & 6).
- The CS3 cell is to be kept flooded with rainwater to minimise risk of wind damage to the HDPE liner.

The following summarises the project progress across the wider project area during August 2018 (Refer to photographs in Table 1: Photograph Progress Log):

- Core sampling was undertaken at the start of Section 5 to check sediment locations and thicknesses (Photograph 3).
- Barge and dredge set up at the beginning of Section 5 (Photograph 4).
- Bailage was lain down beside the SH30 road bridge to promote revegetation of an area that was heavily trafficked during dredging of Section 4 (Photograph 2).
- New survey pegs were installed along the bank of Section 5 (Photograph 7).
- Canal sediment validation was undertaken by GAL in the Kopeopeo/Orini Pump Station inlet channel and the beginning of Section 5 (Photographs 14 &15).
- Shoulder closure put in place and warning signs for the sediment transfer pipeline installed along Shaw Road (Photograph 16).
- Trees cleared from the canal bank adjacent to Shaw Road to allow for the sediment transfer pipeline and boost pump placement (Photograph 17).

- The road bridge barrier on SH30 opposite CS1 was extensively damaged when a member of the public crashed into it. This was observed by the project team; however, the driver drove off as they were calling emergency services (Photograph 18).
- Dredge began removing sediment from Section 5 (Photograph 19).
- A new boost pump was installed at Shaw Road and then broke a few days later (Photograph 21). This required parts are to be flown in from Australia.
- Kope Canal Road is in the process of being resurfaced by WCL (Photograph 22).
- Brendon Love (BOPRC) & Matt James (GHD) completed a sediment thickness and sediment quality investigation ahead of the dredge in Section 5 (Photograph 23).
- Prior to dredging in Section 5, a weed cutter boat working in tandem with a long reach excavator removed weed from the canal in the upper half of Section 5 (Photograph 7).
- Both FCS were used to manage optimal canal water levels for dredging and consent requirements. Where possible, both FCS were kept open to allow water flow through the project area in an effort to lower canal levels to the west of the project area.
- Vehicle and machinery movements along the true left bank of the canal from the Paroa Road Bridge to the SH30 Bridge have damaged vegetative cover and exposed the soil of the stopbank. Provided the ground remains damp, this area will be remediated using bailage as soon as machinery access is no longer required.
- On-going discussion between project team, consent authority and IM to manage turbidity releases from the project area. This is being monitored through a combination of manual water sampling and live turbidity measurements.

Table 1: Photograph Progress Log

| Photograph | Event |
|---|---|
|  | Photograph 1: New shade cloth and fencing installed at CS3. |
|  | Photograph 2: Bailage lain down beside the SH30 road bridge to promote revegetation. |
|  | Photograph 3: Core sampling at the start of Section 5. |
|  | Photograph 4: Barge ready to start dredging in Section 5. |

| Photograph | Event |
| --- | --- |
|  | Photograph 5: New forestry gates installed at CS3 after a vehicle rammed the original gate. |
|  | Photograph 6: Clean soil placed over the top of the potentially contaminated stopbank material disturbed during the gate installation. |
|  | Photograph 7: New markers installed along the bank of Section 5. Weed has also been cut and placed on the canal bank. |
|  | Photograph 8: Oversized material coming off the shakers at the water treatment plant in CS1. |

| Photograph | Event |
| --- | --- |
|  | Photograph 9: Oversized material in the bulk bags stored within CS1. |
|  | Photograph 10: Lime being stored at CS1 prior to being added to the sediment within the geobags. |
|  | Photograph 11: A hole discovered in one of the geobags in CS1. |
|  | Photograph 12: Checks of the geobag damage and coordination with Geofabrics Limited as to the best methodology for repair. |

| Photograph | Event |
| --- | --- |
|  | Photograph 13: Clean-up of sediment from within the CS1 water treatment area bund after an overflow due to dredging into heavy sands. |
|  | Photograph 14: GAL undertaking sediment validation within the Kopeopeo/Orini Pump Station intake channel. |
|  | Photograph 15: GAL undertaking sediment validation at the western end of Section 5. |
|  | Photograph 16: Shoulder closure and warning signs for the sediment transfer pipeline along Shaw Road. |

| Photograph | Event |
| --- | --- |
|  | Photograph 17: Tree clearing on the stopbank adjacent to Shaw Road. |
|  | Photograph 18: Traffic barrier on SH30 was damaged after a member of the public crashed into it. |
|  | Photograph 19: Dredge clearing sediment within Section 5. |

| Photograph | Event |
| --- | --- |
|  | Photograph 20: Damaged bulk bag spilling oversized sediment. |
|  | Photograph 21: New booster pump installed adjacent to Shaw Road. |
|  | Photograph 22: Resurfacing of Kope Canal Road. |

| Photograph | Event |
| --- | --- |
|  | Photograph 23: Sediment thickness investigations ahead of the dredge in Section 5. |

# 3. Community Liaison Group Update

## 3.1 CLG meeting – August 2018

The following is a summary of the discussions during the CLG meeting undertaken on 21 August 2018:

- Access through CS3 remains closed and public notices have been broadcast on the radio and in the local newspaper.
- Professor Chris Anderson and Dr Joanne Kelly presented on the bioremediation strategy.
- A project update included operations and timeline updates.
- The IM field observer presented a summary on validation in Section 4 and ongoing turbidity issues.
- Des McCleary (ESL) provided an update on project health and safety.
- Tani Wharewera accepted the role of Community Monitor.

The project complaints register for August 2018 was reviewed by the IM. A summary table is presented in Section 4.10.

# 4. IM Inspection Summary

This section outlines the observations made during the site inspections undertaken by the IM field observer during August 2018.

## 4.1 Vegetation Clearing, Fauna, Topsoil Management and Rehabilitation & Visual Amenity

### 4.1.1 Project Area

The eel removal report was reviewed by the IM in March 2018. The results of eel tissue testing within the project area and at selected control sites are still pending.

Topsoil has been disturbed along the true left bank of the canal between Paroa Road and SH30. This area is being monitored and bailage may be applied to promote revegetation if required.

Topsoil was disturbed beside the SH30 road bridge by vehicles accessing the area and by works associated with another project. This area has been covered in bailage to promote revegetation and minimise dust generation risk.

Trees were cut back and removed on the stopbank between Shaw Road and the Kopeopeo Canal to allow for better access in the area.

### 4.1.2 CS1

Odour from the sediments at the CS1 treatment plant has been previously noted. Odour from the remnants of decomposing eels in the water treatment plant was noted. Odour neutralisers are available if required and will be placed around the water treatment plant should odours be detected outside the CS1 boundary.

### 4.1.3 CS3

Topsoil on a stopbank was disturbed at the entrance to CS3 during the installation of a new forestry gate. The area of stopbank disturbed was covered in imported clean topsoil and cordoned off to promote revegetation.

Phillips Contractors Limited has installed a wire fence and completed the artificial shelterbelt around CS3 to restrict public access and improve safety and security.

## 4.2 Drainage, Sediment & Water Management

### 4.2.1 Project Area

Flood control structures at the eastern and western ends of the KCRP area are used to maintain optimal water levels for dredging and consent requirements. Turbidity monitoring is intended to check that turbidity in the Orini/Kopeopeo confluence is no greater than 20% above background. During late August, discharge has been occurring regardless of turbidity due to high turbidity inflows from outside the project area affecting the turbidity monitoring network. This discharge has been allowed as increased dioxin testing of the discharge water has demonstrated that the dioxin concentrations are still below the consent limits (See Section 5.2).

An agreement was reached between the project team, consent authority and IM that due to the limitations with the turbidity monitoring network in certain situations, predominantly during periods of high turbidity inflow from sources outside the project area, a dioxin in discharge water target should be adopted. The adopted target of 11 pg/L was based upon the Opus International

Consultants Limited *Kopeopeo Canal Remediation – Memo regarding Filtrate Discharge* report dated 09 June 2016 that stated that the no observed effect concentration (NOEC) for dioxin was between 11 pg/L and 38 pg/L. The NOEC is the concentration of a contaminant at which no adverse effects were observed within the control animals. Consent Condition 12.3 also provides 11 pg/L as the long-term discharge limit for the filtrate leaving the containment sites after the control structures have been removed. The intended use of this limit is similar to the current discharge from the control structures, and as such the criterion is likely to be suitable for this use.

The flood control structures are checked daily and the side culverts of the canal are checked weekly. These checks are reported as part of the Flood Management Situation Report prepared by the deputy project manager on a daily basis as part of the requirements outlined in the Bay of Plenty Regional Council Resource Consent 67173-AP Condition 7 – Flood Management. The Flood Management Situation Report is emailed to the following parties:

- BOPRC flood managers and consent authority
- Whakatane District Council
- Kopeopeo Canal Remediation Project site managers and site engineers
- Kopeopeo Canal Remediation Project administrator and contractors
- IM field observer
- BOPRC compliance officer

Real time turbidity monitoring equipment is operational within the Kopeopeo and Orini canals and within the sump at CS1.

#### 4.2.2 CS1

Rainfall is being collected in CS1 and discharged to the canal as part of the sediment dewatering process. CS1 is being kept in a semi-flooded state when the dredge is not operating to ensure that the area is covered in water and dust cannot be generated.

#### 4.2.3 CS3

Rainfall is being collected in CS3 and discharged when necessary into the Kopeopeo Canal.

### 4.3 Dust Management

#### 4.3.1 CS1

No nuisance-dust monitoring is being undertaken at CS1 as no dust generating activities are taking place. Three rounds of dioxin ambient air monitoring have been completed as per Bay of Plenty Regional Council Resource Consent 67173-AP Condition 39 – Dioxin & Air Quality Monitoring.

#### 4.3.2 CS3

No nuisance-dust monitoring is being undertaken at CS3 as no dust generating activities are taking place.

### 4.4 Waste Management and Hazardous Material

#### 4.4.1 CS1

Rubbish is being collected within the site office and removed off site.

Oversized material coming off the water treatment plant as part of the sediment dredging process is being stored on site in one-ton bulk bags. These bags are then crane lifted into the containment cell. Approximately 657 bulk bags have been filled with oversized material to 31 August 2018.

One bulk bag was damaged as it sat awaiting the crane lift into the containment cell (Photograph 20 in Table 1: Photograph Progress Log). The material that spilled from the bag was collected, placed into a new bulk bag, and crane lifted into the containment cell.

#### 4.4.2 CS3

Rubbish is being collected within the site office and removed off site.

## 4.5 Heritage

During August there were no artefacts identified by the Cultural Monitor or archaeologist as Koiwi or Taonga. Small bone fragments are being bagged and reported as they come across the screens on the water treatment plant. The Cultural Monitor or her representative is notified of all dredging activity to allow monitoring of the oversized material.

The Cultural Monitor has also presented a draft version of a non-urgent discovery protocol designed to deal with small animal bones in the most practical manner. This protocol was prepared in consultation with Te Rūnanga o Ngāti Awa representatives and BOPRC and is intended to assist the Cultural Monitor in dealing with Koiwi or Taonga. This protocol is in addition to the requirements outlined in Bay of Plenty Regional Council Resource Consent 67173-AP Condition 32.1.

## 4.6 Fire Prevention and Response

No issues pertaining to fires were reported during August 2018.

## 4.7 Weed & Dieback Management

Pipeline warning signage along Shaw Road was installed in early August to align with works in Section 5. The signage is designed to ensure the pipeline is clearly visible within the vegetation along the shoulder of Shaw Road and the stopbank. This will help ensure vehicles operating on the road do not hit the pipeline, and lower the risk of trips or falls for members of the public or project team walking along the canal bank.

A weed cutter boat working in conjunction with an excavator was employed to remove weeds from the first half of Section 5 ahead of the dredge operation. This involves the cutter boat cutting the weeds above the canal base. The weed is checked for sediment and then placed on the canal bank. This weed has not been tested for dioxin, however, previous dioxin testing of weed removed from the canal (CLG Update Report (April 2018)) has shown that it is unlikely to present a risk to humans, animals, or the environment. The potential for odour issues to occur as the weed dries or rots has been identified and will be monitored.

## 4.8 Worker Wellbeing

There was one recorded injury during August 2018. The injury involved a staff member cutting their hand on a metal fencing post. The injury was treated on site. To prevent this incident happening again, staff were provided with new reinforced gloves and glove clips for their belts.

Fatigue has been a concern raised by the IM and community members over the last eight months, largely due to the strenuous nature of the work and the long hours for the dredging contractors. To mitigate fatigue risks within the team, the rotating week-off roster system continues to be implemented.

## 4.9 Community Interest

A staircase has been erected on the public access path at the northern end of CS3 to enhance public access to the Whakatane River stopbank.

A shoulder closure is now in effect along the southern side of Shaw Road between the SH30 Bridge and the gate at the start of Kope Canal Road. Parking within this area is limited to a single vehicle. Supplementary parking is available in front of the stopbank gate and in the designated carpark adjacent to the site office on the neighbouring subdivision.

Security fencing around CS3 was completed by Phillips Contractors Limited following completion of rock armouring along the banks of the inlet canal to Kope Orini pump station.

The whitebait season opened in early August. One complaint has been received about access restrictions to the lower Whakatane River.

A member of the public crashed into the SH30 road bridge barrier outside of CS1 after crossing the centre line and narrowly missing an oncoming car. A member of the project team was on site and went to assist the woman who crashed, but as the team member moved away from the vehicle to call for help, the driver drove away.

## 4.10 Complaints Register

The project complaints register for August 2018 was reviewed by the IM and the following complaints were received:

Table 2: Complaints Register Summary Table

| Date | Complaint | Corrective Action |
|---|---|---|
| 06/08/2018 | The complainant was not happy that there was no vehicle access through CS3 during whitebait season and mentioned that he believes people may try to force their way through the CS3 gates. | Robbin Britton (acting Engineers Representative) called the complainant, explained that the gates must remain closed for safety reasons, and apologised for the inconvenience. |
| 08/08/2018 | The complainant provided photographs showing damage to the berm outside their property from a vehicle. | The project team acknowledged that the damage was caused by WCL and not the project team. WCL fixed the damage to the grass and cordoned off the area. The project team then contacted the complainant to ask if there were any further concerns. |

## 4.11 Compliance Auditing

Bay of Plenty Regional Council undertook a compliance audit on 31 August 2018. The following comments were received:

- The BOPRC compliance officer would like to be notified when the FMP is activated. The BOPRC compliance officer has since been added to the FMP daily mailing list.
- The BOPRC compliance officer requested another round of dioxin testing in the area where the bulk bags are stored temporarily prior to being lifted into the containment cell. The project team and IM agree that this is to be undertaken once this area has stopped being used for temporary bulk bag storage.

- The BOPRC compliance officer requested further information as to the process for achieving adequate cover depth over the geobags. This is due to some of the bags bulging upwards.
- The top of the stopbank near Paroa Road was identified as having been disturbed by vehicles. Sowing the area with grass and filling any potholes was listed as adequate remedial action.
- CS3 and FCS-East were reported as being in good condition.

# 5. Monitoring and Validation

The validation and sampling strategy is outlined in the Environmental Monitoring and Validation Plan (EMVP) submitted as a requirement under Bay of Plenty Regional Council Resource Consent 67173-AP Condition 4.5.

## 5.1 Canal Sediment

The Bay of Plenty Regional Council Resource Consent 67173-AP Condition 25.4 states that "The remediation zone within the Kopeopeo Canal shall be deemed as being remediated when the 95% Upper Confidence Limit ('UCL') for dioxin concentration is determined to be at or below 60 pg I-TEQ-g using the validation methodology set out in the Environmental Monitoring and Validation Plan required by condition 4.5". The technical definition of a 95% UCL is "a number that one can be 95% confident that the true mean (average) concentration of the population is below that value".

The first round of validation testing in Section 5 involved taking four samples on 13 August 2018. The Total PCDD/F I-TEQ Upperbound results were between 22 and 83 pg/g. Due to a single exceedance (83 pg/g) of the remedial target (60 pg/g), the first 33 m of Section 5 will be redredged in accordance with the EMVP.

The 95% UCL for Total PCDD/F I-TEQ Upperbound results from the first 2000 m validated length of the Kopeopeo Canal was 36.41 pg/g, which is below the remedial target of 60 pg/g.

## 5.2 Canal Water

Canal water was sampled for dioxins at FCS-East (MP8) and the compliance point (MP10) during August to confirm that dioxin levels in discharge water were acceptable. Two samples collected by BOPRC returned Total PCDD/F I-TEQ Upperbound results of 8.1 pg/L at MP8 and 6.92 pg/L at MP10. Turbidity was also recorded using the remote turbidity sensor network and returned results of 50.6 NTU at MP8 and 22.4 NTU at MP10. These results are below the NZ Drinking Water Standards of 30 pg/L and below the adopted criterion of 11 pg/L.

## 5.3 Groundwater

Golder Associates completed a second round of dioxin in groundwater sampling on 24 and 25 August 2018 from the monitoring wells surrounding CS3. Groundwater Total PCDD/F I-TEQ Upperbound results ranged between 4.11 and 8.88 pg/L for CS3.

The CS3 results are being used to inform background Total PCDD/F I-TEQ Upperbound concentrations in the groundwater beneath CS3 prior to sediment being deposited in the containment cell. Two rounds of background groundwater sampling have now been completed as required under Consent Condition 36.5.

## 5.4 CS1 Perimeter Drain

Three sediment samples were taken from the perimeter drains surrounding CS1 on 13 August 2018. The total PCDD/F I-TEQ Upperbound results ranged between 20 and 23 pg/g. 20 pg/g is the lowest value achievable with this laboratory limit of detection and all samples were below the remedial target of 60 pg/g.

# 6. Consent Monitoring Summary

The following consent monitoring summary is intended as a high level summary of consent compliance from the IM as per BOPRC Resource Consent 67173-AP Condition 6.3 (b). This summary is intended to provide the CLG with visibility and assurance that consent compliance is being achieved. The summary only lists conditions that are relevant at the time of writing this report. This summary is not intended to proving compliance with the BOPRC Resource Consent to a consent authority.

Table 3: Consent Monitoring Summary Table

| Condition[1] | Description | Compliance | Details |
|---|---|---|---|
| 6.1 – 6.3 | Independent Monitor | Yes | Continued on site monitoring and reporting. |
| 7.1 – 7.5 | Flood Management | Yes | Flood management undertaken in accordance with FMP. |
| 9.1 – 9.5 | Erosion and Sediment Controls for Land Outside Canal | Yes | Compliant within KCRP. |
| 10.1 – 10.2 | Erosion and Sediment Controls – Canal Works and Discharges to Water | Yes | Some slumping of the canal banks throughout Section 4 has been noted after heavy rain events. |
| 11.1 – 11.3 | Site Access & Traffic Management | Yes | A shoulder closure has been put in place on Shaw Road due to the sediment transfer pipeline running along the road edge. WCL also has various traffic management plans in place to manage traffic around the construction of the new residential subdivision off Shaw Road. |

[1] Bay of Plenty Regional Council Resource Consent 67173-AP (12 May 2017).

| Condition[1] | Description | Compliance | Details |
|---|---|---|---|
| 12.2 | Discharges from the Containment Sites (Filtrate and Stormwater) | Yes | Stormwater and filtrate are being released into the Kopeopeo Canal. Live turbidity monitoring is checking that these releases have minimal sediment loads. This is not a consent requirement while the FCS are in place. |
| 13.1 – 13.3 | Water Quality Monitoring in the Kopeopeo Canal Outside the Remediation Zone | Yes | Real time turbidity monitoring shows that turbidity in the Orini/Kopeopeo confluence was at times greater than 20% above background. This sediment-laden discharge was analysed for dioxin and shown to be below adopted acceptable limits. |
| 15.1 | Kopeopeo Canal Vegetation Disturbance | Yes | Soil has been disturbed along the true left stopbank between Paroa Road and SH30 by vehicles accessing this area during dredging. This area will be monitored for vegetation growth and covered with straw to promote revegetation if required. |
| 17.1 & 17.5 | Kopeopeo Canal Control Structures | Yes | FCS operating appropriately and mobile pumping stations are established in accordance with the FMP. Surrounding properties were reporting that extensive surface flooding remained far longer than is expected and this is being associated with the FCS limiting water flow east. FCS-West has been opened as much as possible to allow water to move through the project area. |
| 19.1 | Excavation of Sediment - Removal Methodology | Yes | The extraction of sediment from the Kopeopeo Canal is being undertaken in general accordance with the methods in the variation application and the Dredging Management Plan. |
| 20.1 | Containment Sites - Sediment Disposal | Yes | The sediment extracted from the Kopeopeo Canal is being transported and deposited at the containment sites in general accordance with the variation application and the Dredging Management Plan. |
| 21.1 | Containment Sites - Stormwater | Yes | Stormwater is being appropriately managed. |

| Condition[1] | Description | Compliance | Details |
|---|---|---|---|
| 22.1 – 22.3 | Cleaning of Machinery, Structures and Debris | Yes | Equipment is being appropriately cleaned. |
| 25.1 | Validation Sampling – Kopeopeo Canal | Yes | Validation sampling being undertaken as quickly as is practical. |
| 25.2 | Validation Sampling – Kopeopeo Canal | Yes | 1 in 20 sediment samples taken shall be split and analysed at two different laboratories for the purpose of quality assurance. |
| 25.5 | Validation Sampling – Kopeopeo Canal | Yes | Control structures in place. |
| 26.1 – 26.4 | Communication – Community Liaison Group | Yes | CLG being adequately informed of project activities. |
| 27.1 – 27.2 | Complaints Register | Yes | Complaints register reviewed (Section 4.10). |
| 28.1 – 28.5 | Spill Prevention & Response | Yes | One bulk bag was damaged as it sat outside the containment site awaiting a crane lift. The material that spilt was scraped up and placed into a new bulk bag. Photograph 20 in Table 1: Photograph Progress Log shows the spill. |
| 29.1 | Hazardous Substances | Yes | No spills of hazardous substances. |
| 30.1 | Signage | Yes | Appropriate signage is in place along the length of the sediment transfer pipeline. Signs are in place identifying CS3 is closed to public access and directing the public towards alternative walking access along the eastern boundary of CS3. Signage on the walking access also informs the public that the path is not designed to be used by motorcycles. |
| 31.1 – 31.2 | Archaeological Sites | Yes | No Koiwi or Taonga has been discovered. |
| 32.1 – 32.2 | Cultural Monitor | Yes | The Cultural Monitor or an appropriately trained representative is on site to provide oversight during the dredging. |

| Condition[1] | Description | Compliance | Details |
|---|---|---|---|
| 33.1 | Hours of Work | Yes | Consented hours are 7 am to 6 pm. The consent states 7.30 am; however, permission was given by the consent authority to start at 7 am. |
| 34.1 | Access for Monitoring | Yes | Access has been provided to BOPRC at their request. |
| 35.1 – 35.6 | Water Metering & Reporting – Taking Water | NA | The consent authority stated, “this consent condition is void for the current methodology and BOPRC acknowledges that it is not needed to be complied with”. |
| 36.2 | Groundwater Monitoring & Responses | Yes | Groundwater monitoring undertaken as described in the GMP. |
| 36.4 | Groundwater Monitoring & Responses | Yes | Bi-monthly (every 2 months) groundwater level monitoring is being undertaken at CS1. |
| 36.5 | Groundwater Monitoring & Responses | Yes | Background groundwater monitoring is complete for both CS1 and CS3. |
| 36.6 – 36.7 | Groundwater Monitoring & Responses | Yes | Groundwater quality monitoring to be undertaken quarterly. |
| 38.1 – 38.2 | Air Quality – General | Yes | Air quality undertaken in accordance with the EMVP. |
| 39.1 – 39.6 | Dioxin & Air Quality Monitoring | Yes | Ambient air monitoring complete at CS1 with results received to date being below consent limits. |
| 40.1 – 40.7 | Dust Management | Yes | Dust is being appropriately managed. |
| 41.1 | Dust Monitoring | Yes | Dust is being appropriately monitored using visual means. |
| 42.1 – 42.3 | Remedial Action for Dust Emissions at the Containment Sites | Yes | No dust emissions have been identified. |

| Condition[1] | Description | Compliance | Details |
|---|---|---|---|
| 43.1 – 43.4 | Odour Management & Monitoring | Yes | Slight odour identified within CS1, but no odour identified outside the site boundary. |
| 44.1 – 44.3 | Soil Quality & Monitoring | Yes | Baseline soil sampling undertaken at CS3. |
| 45.1 – 45.3 | Aquatic Species | Yes | Suitable fish removal undertaken within the KCRP area. |
| 46.1 | Saltmarsh | Yes | Water levels within the canal are not being artificially held above 0.2 m RL (Moturiki Datum). |

# 7. Conclusion

In August 2018, dredging of Section 5 of the Kopeopeo Canal commenced, followed by the first round of sediment validation sampling within this section. The Total PCDD/F I-TEQ Upperbound results were between 22 and 83 pg/g. Due to a single exceedance (83 pg/g) of the remedial target (60 pg/g), the first 33 m of Section 5 will be redredged in accordance with the EMVP.

PCDD analytical results were also received for groundwater collected beneath CS3, the canal water discharging from FCS-East, and the sediment in the perimeter drains surrounding CS1.

The CS3 groundwater results are being used to inform background Total PCDD/F I-TEQ Upperbound concentrations in the groundwater beneath CS3 prior to sediment being deposited in the containment cell. Two rounds of background groundwater sampling have now been completed as is required under Consent Condition 36.5.

Canal water was sampled for dioxins at FCS-East (MP8) and the compliance point (MP10) during August to confirm that dioxin levels in discharge water were acceptable. The results are below the NZ Drinking Water Standards of 30 pg/L and below the adopted criterion of 11 pg/L.

Three sediment samples were taken from the perimeter drains surrounding CS1 on 13 August 2018. The total PCDD/F I-TEQ Upperbound results were below the remedial target of 60 pg/g, and in most cases were at the laboratory limit of reporting (20 pg/g).

The consent monitoring summary provides a high-level indicative check of compliance with BOPRC Resource Consent 67173-AP.

# Appendices

# Appendix A – Site Plan


Paper Size A4

0 25 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

N

LEGEND

- Turbidity monitoring point
- CS1
- FCS West
- Water treatment plant
- Topsoil stockpile
- Property boundary

Bay of Plenty Regional Council
Kopeopeo Canal Remediation Project

| | |
|---|---|
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| Date | 18 Sep 2018 |

Site Plan

Figure 1

N:\NZ\Auckland\Projects\51\33279\GIS\Maps\Deliverables\51_33279_Z001_SitePlan.mxd

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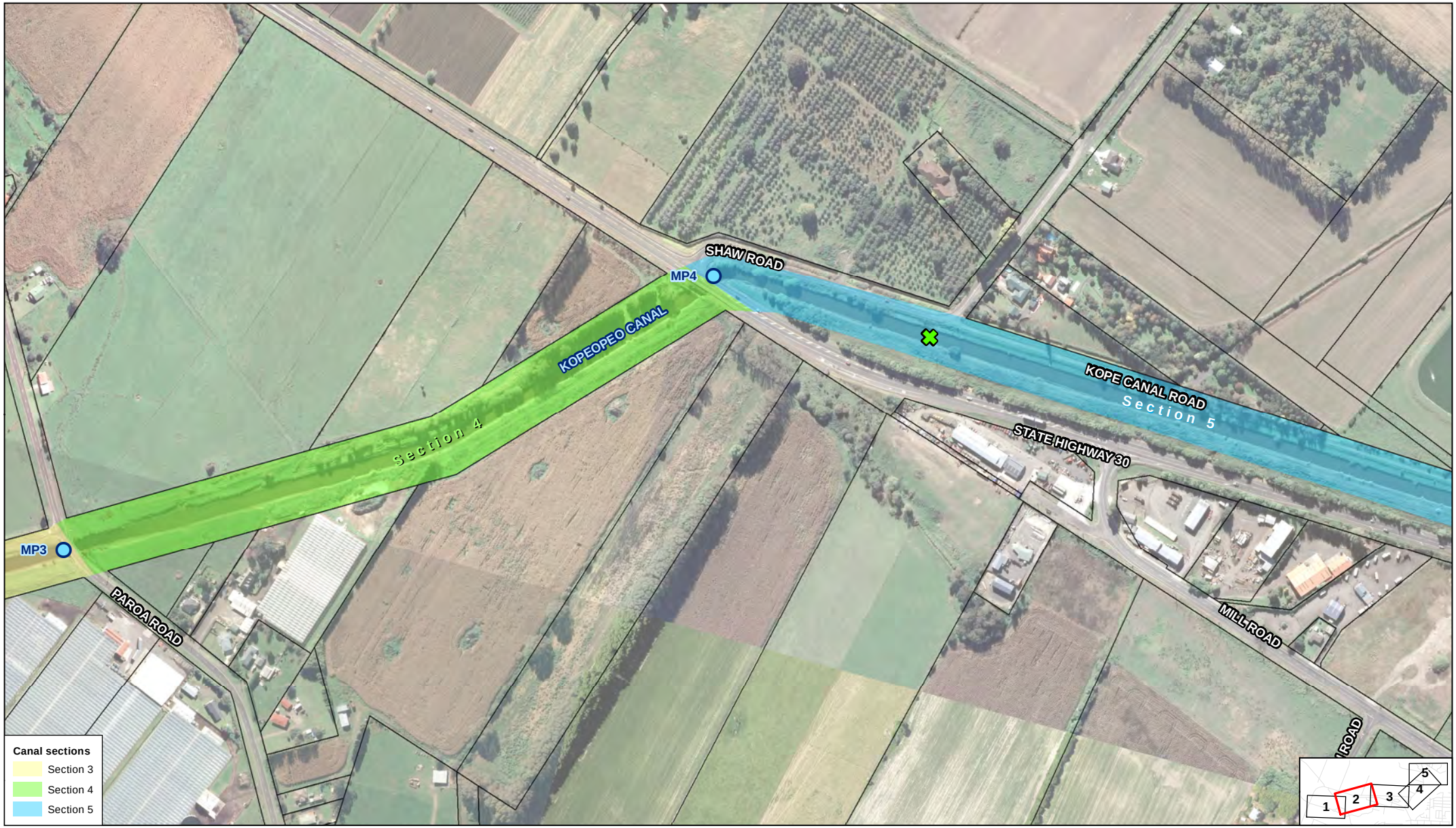
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018. Created by:jrprice




Paper Size A4

0 25 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

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LEGEND

- Turbidity monitoring point
- Current dredge location
- Property boundary

Bay of Plenty Regional Council
Kopeopeo Canal Remediation Project

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|---|---|
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| Revision | A |
| Date | 18 Sep 2018 |

Site Plan

Figure 2

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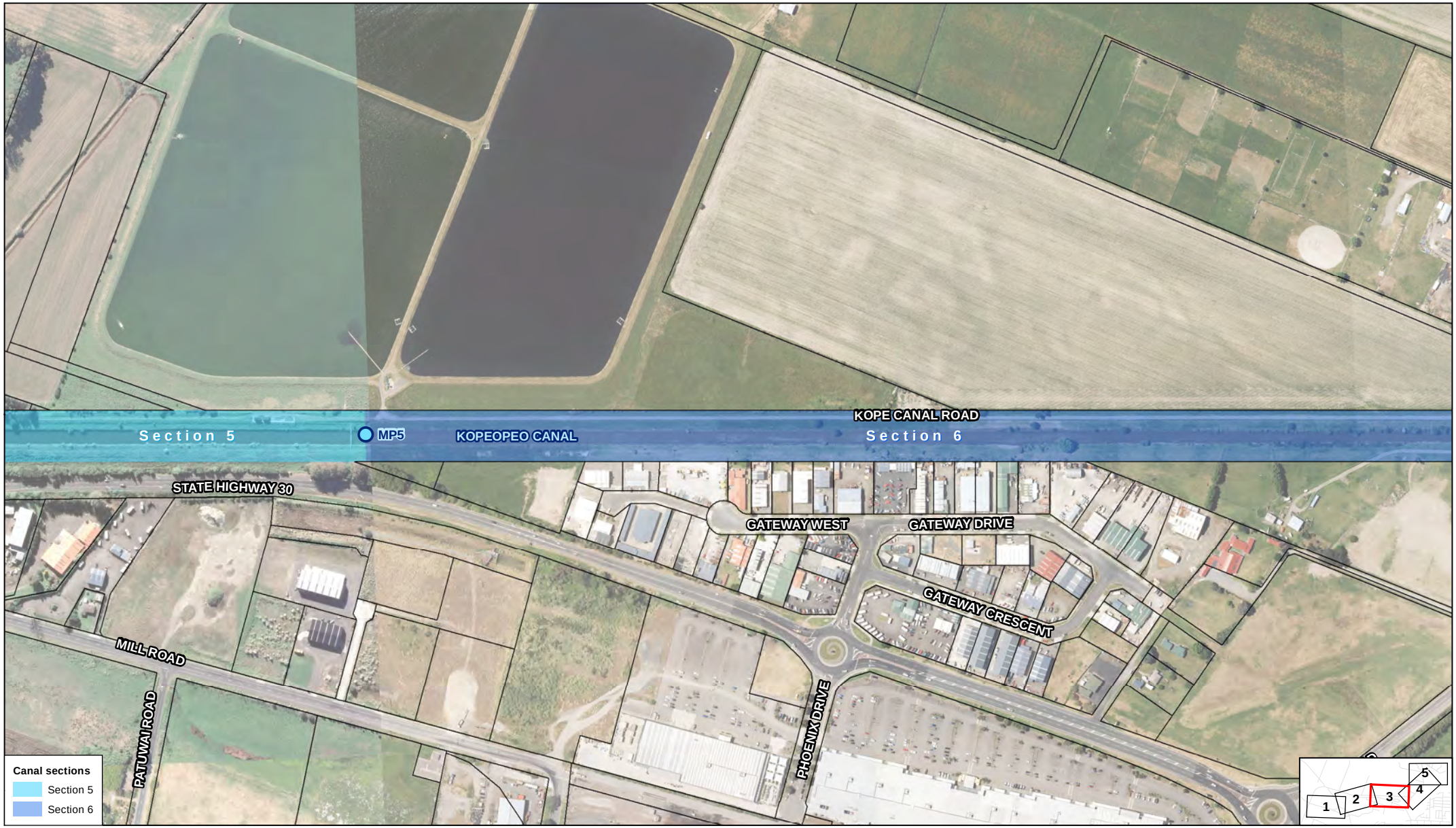
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018. Created by:jrprice




Paper Size A4

0 25 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

N

LEGEND

- Turbidity monitoring point
- Property boundary

Bay of Plenty Regional Council
Kopeopeo Canal Remediation Project

| | |
|---|---|
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Site Plan

Figure 3

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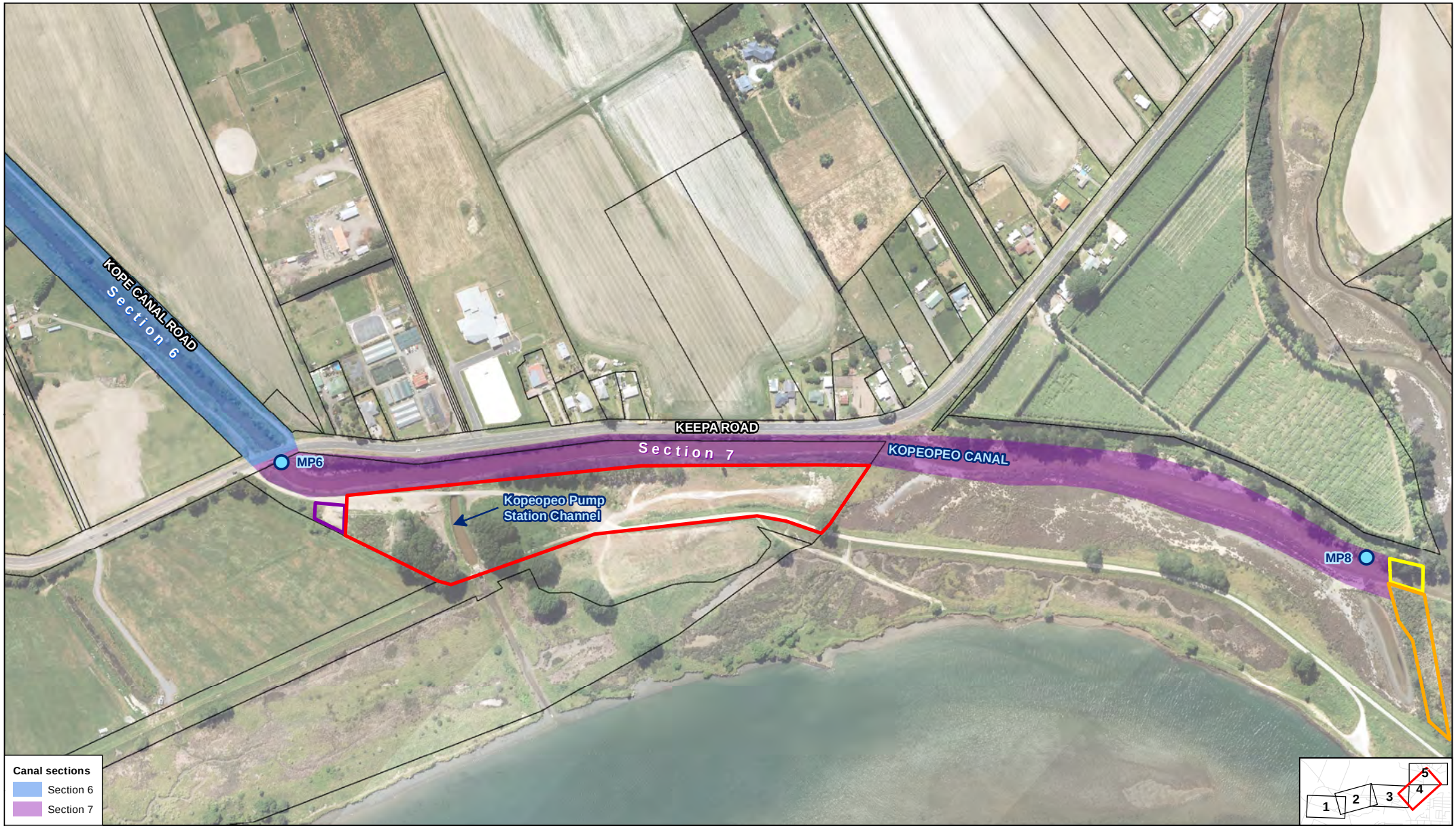
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018. Created by:jrprice




Paper Size A4

0 25 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Turbidity monitoring point
- Access road built to enable control structure construction
- CS3
- FCS East
- Public car park
- Property boundary

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Kopeopeo Canal Remediation Project

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|---|---|
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Site Plan

Figure 4

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Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018. Created by:jrprice


Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

N

LEGEND

- Compliance Turbidity monitoring point
- Turbidity monitoring point
- Access road built to enable control structure construction
- FCS East
- Property boundary

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Kopeopeo Canal Remediation Project

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Site Plan

Figure 5

N:\NZ\Auckland\Projects\51\33279\GIS\Maps\Deliverables\51_33279_Z001_SitePlan.mxd

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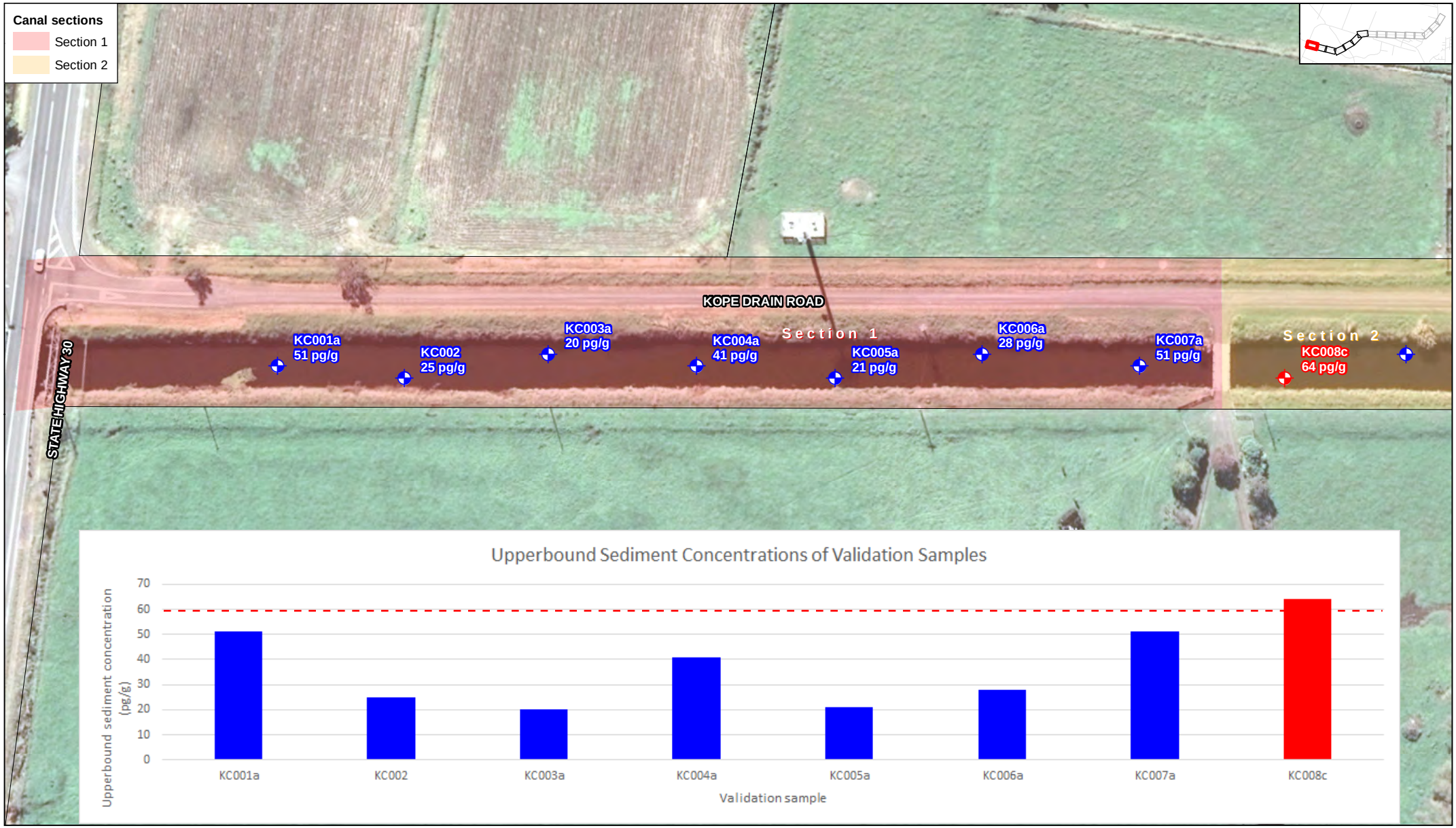
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018. Created by:jrprice

# Appendix B – Canal Sediment Validation Locations

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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Kopeopeo Canal Remediation Project

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Validation Samples

Figure 1

N:\NZ\Auckland\Projects\51\33279\GIS\Maps\Deliverables\51_33279_Z002_ValidationSamples.mxd

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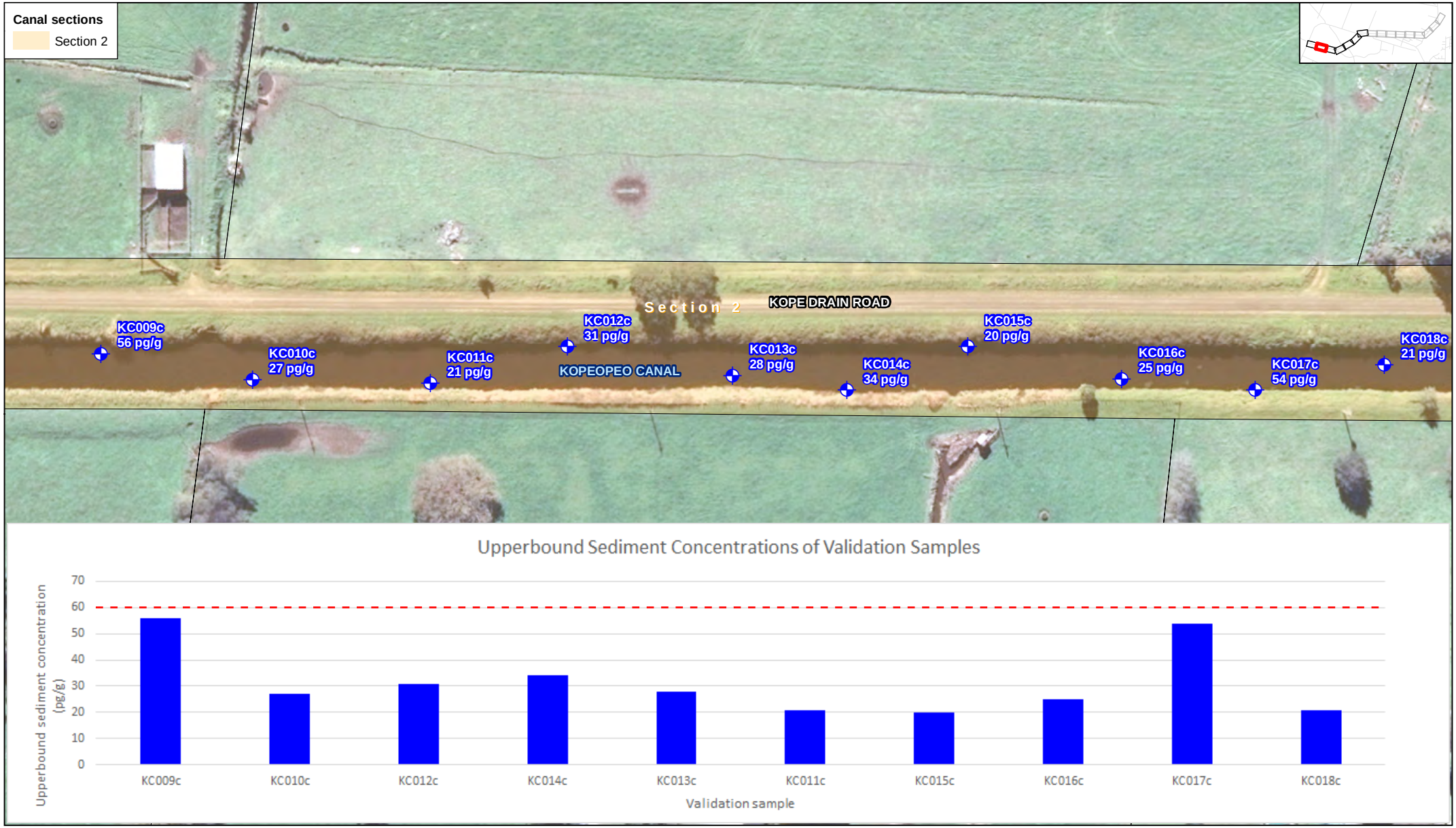
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018; Validation samples - Golder. Created by:jrprice




Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

N

LEGEND

Validation samples (upperbound sediment concentration < 60 pg/g)

Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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|---|---|
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| Date | 19 Sep 2018 |

Validation Samples

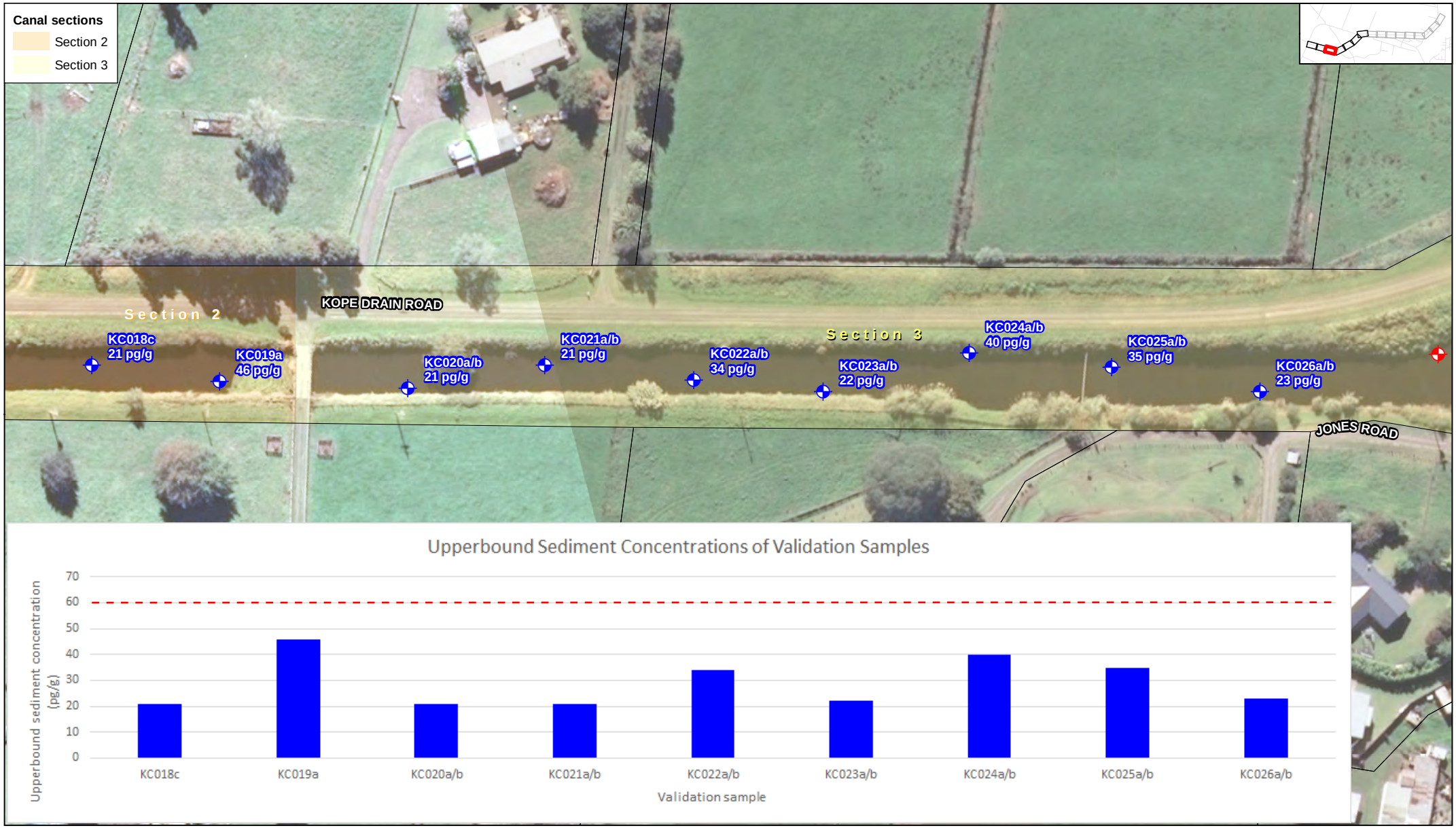
Figure 2

N:\NZ\Auckland\Projects\51\33279\GIS\Maps\Deliverables\51_33279_Z002_ValidationSamples.mxd

Level 1, 104 Spring Street, Tauranga 3110, New Zealand **T** 64 7 557 0110 **E** aklmail@ghd.com **W** www.ghd.com



Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018; Validation samples - Golder. Created by:jrprice




Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

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LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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Validation Samples

Figure 3

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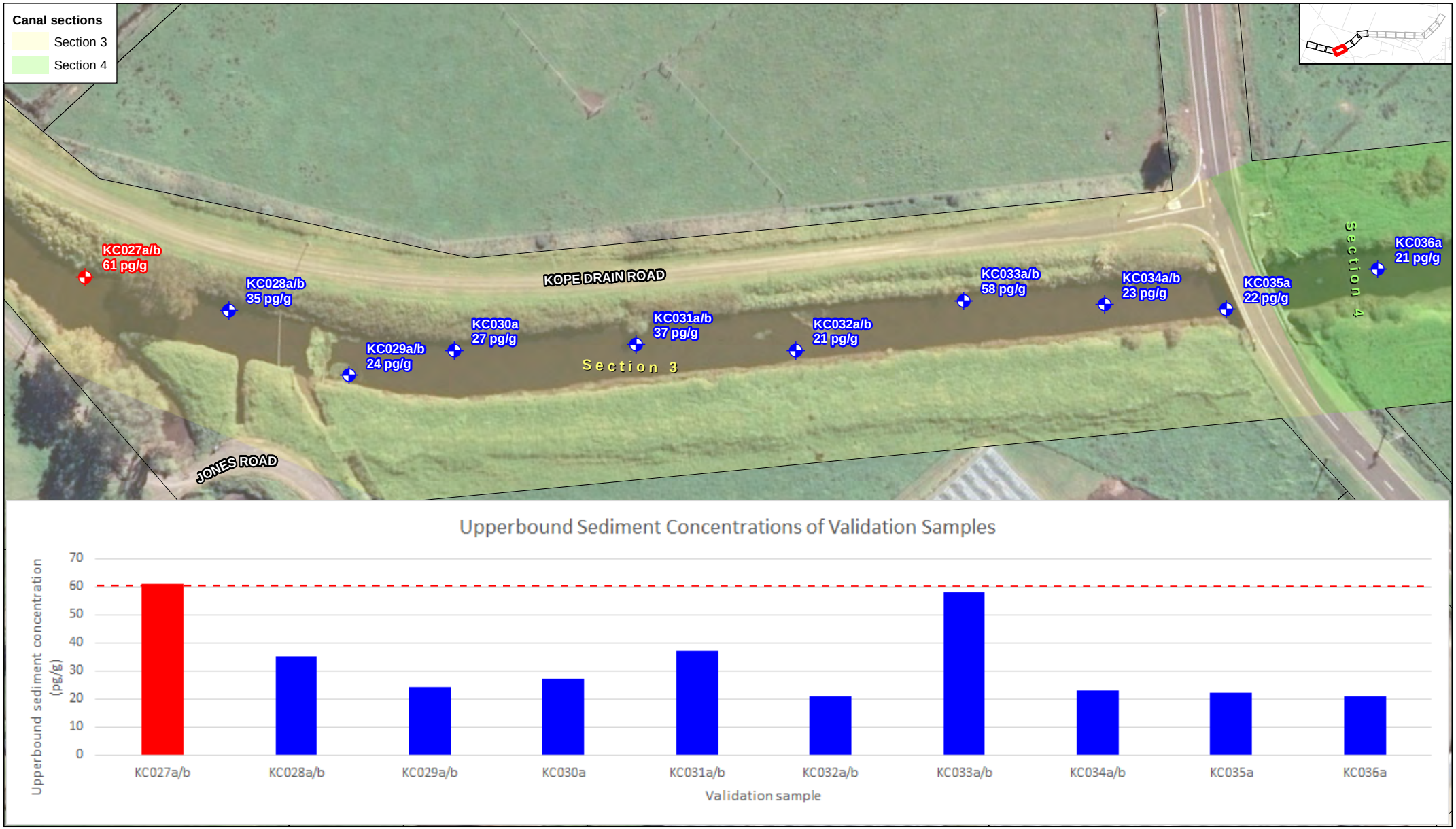





Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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Kopeopeo Canal Remediation Project

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Validation Samples

Figure 4

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Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018; Validation samples - Golder. Created by:jrprice


Paper Size A4

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Superseded historic validation samples prior to redredge
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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# Validation Samples

Figure 5

N:\NZ\Auckland\Projects\51\33279\GIS\Maps\Deliverables\51_33279_Z002_ValidationSamples.mxd

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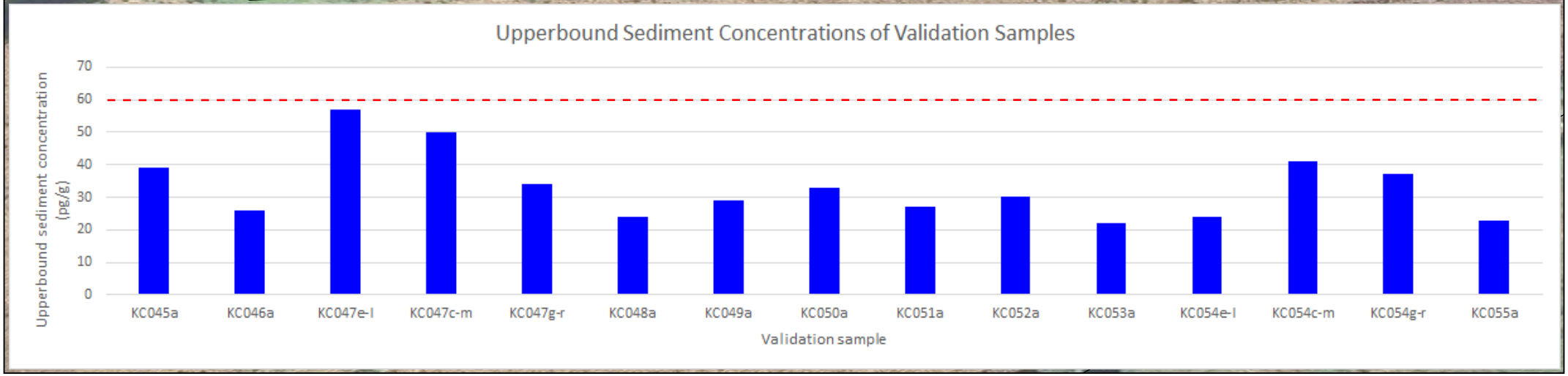
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018; Validation samples - Golder. Created by:jrprice


Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Superseded historic validation samples prior to redredge
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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Validation Samples

Figure 6

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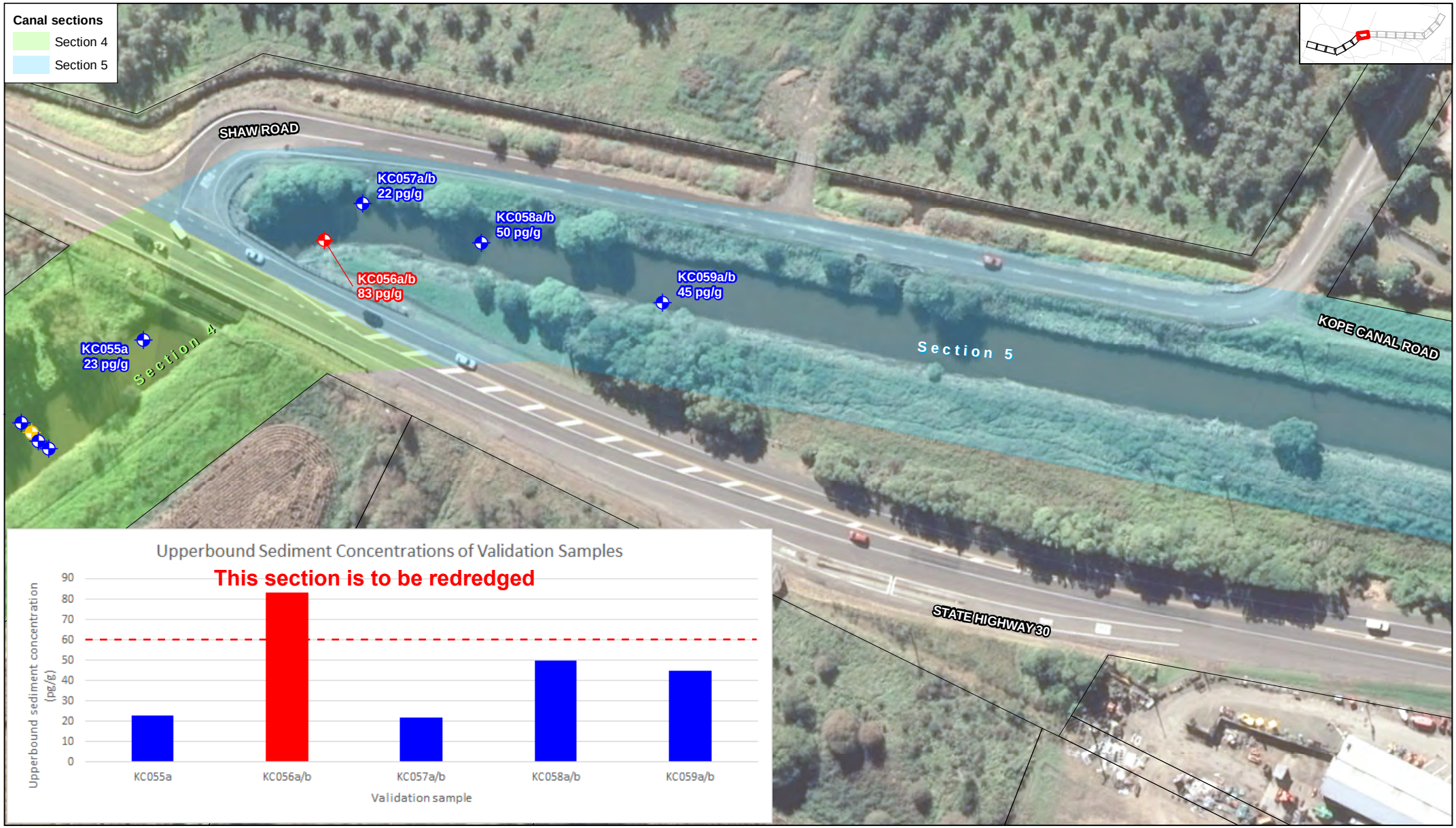
Data source: Aerial imager - LINZ 2018 & ESRI 2018; General topo - LINZ 2018; Validation samples - Golder. Created by:jrprice

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

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LEGEND

- Validation samples (upperbound sediment concentration < 60 pg/g)
- Validation samples (upperbound sediment concentration > 60 pg/g)
- Superseded historic validation samples prior to redredge
- Property boundary

Canal Sediment Validation 95% UCL of 36.41 pg/g
Remedial target = 60 pg/g

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Date 20 Sep 2018

Validation Samples

Figure 7

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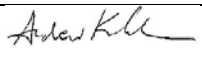
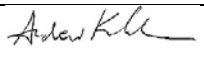
Document Status

| Revision | Author | Reviewer | | Approved for Issue | | |
|---|---|---|---|---|---|---|
| | | Name | Signature | Name | Signature | Date |
| 1.0 | M. James | A. Kohlrusch |  | A. Kohlrusch |  | 24/10/2018 |
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