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| Version No: 1.0 Issue Date: 26/07/2022 Portfolio: Discrete Water Quality | Horizons Regional Council | Section No: 15.7 Appendix No: XX Page: 1 of 20 |
| horizons regional council  | Hydrology Operations Manual |  horizons regional council |

Version 1.0 26/07/2022

Invertebrate Monitoring Run Guide

Mangatainoka Run 1

STATE OF ENVIRONMENT (Annual Sampling)

Job Hazard & Task Analysis










Hazard Identification – tick all that apply, write additional hazards identified:

The yellow highlighted hazards are known hazards at the time of compiling this document. This **does not negate** the need to assess for and potentially eliminate or isolate any hazards at *each* sample location at *every* visit

| Hazard | Yes | Hazard | Yes | Hazard | Yes |
|--------------------------------|-------------------------------------|---------------------------------------|-------------------------------------|------------------------------|-------------------------------------|
| Confined space | <input type="checkbox"/> | Suspended loads | <input type="checkbox"/> | Noise – plant and equipment | <input type="checkbox"/> |
| Difficult entry/exit | <input checked="" type="checkbox"/> | Falling objects | <input type="checkbox"/> | Communication – means of | <input checked="" type="checkbox"/> |
| Oxygen deficiency/excess | <input type="checkbox"/> | Working near cranes and crane runways | <input type="checkbox"/> | Remote area | <input checked="" type="checkbox"/> |
| Poisonous fumes/gas | <input type="checkbox"/> | Live rails-gantry cranes | <input type="checkbox"/> | Temperature extremes | <input checked="" type="checkbox"/> |
| Explosive gas | <input type="checkbox"/> | Trip hazards | <input checked="" type="checkbox"/> | Reduced visibility | <input checked="" type="checkbox"/> |
| Flammable materials | <input type="checkbox"/> | Slippery surfaces | <input checked="" type="checkbox"/> | Unauthorized persons | <input type="checkbox"/> |
| Combustible materials | <input type="checkbox"/> | Manual handling | <input checked="" type="checkbox"/> | High pressure water | <input type="checkbox"/> |
| Hazardous substances | <input type="checkbox"/> | Sharp materials | <input type="checkbox"/> | Vacuum | <input type="checkbox"/> |
| Drowning | <input checked="" type="checkbox"/> | Line of fire | <input type="checkbox"/> | Air emissions – dust, fumes | <input type="checkbox"/> |
| Engulfment | <input type="checkbox"/> | Pressurized fluids | <input type="checkbox"/> | General waste | <input type="checkbox"/> |
| UV Radiation | <input checked="" type="checkbox"/> | Pressurized air/gas | <input type="checkbox"/> | Hazardous waste | <input type="checkbox"/> |
| Electrical – low /high voltage | <input checked="" type="checkbox"/> | Traffic / vehicle movements | <input checked="" type="checkbox"/> | Hydrocarbon / chemical spill | <input type="checkbox"/> |
| Multiple electrical feeds | <input type="checkbox"/> | Machinery – mobile plant | <input type="checkbox"/> | Soil disturbance/erosion | <input type="checkbox"/> |
| Working at height | <input type="checkbox"/> | Moving parts | <input type="checkbox"/> | Habitat disruption | <input type="checkbox"/> |
| Ladders | <input type="checkbox"/> | Chemical reaction (Pyrophoric iron) | <input type="checkbox"/> | Lighting | <input type="checkbox"/> |
| Elevated work platforms | <input type="checkbox"/> | Transport of hazardous substances | <input type="checkbox"/> | Weather extremes | <input checked="" type="checkbox"/> |
| Potential for difficult rescue | <input checked="" type="checkbox"/> | Stock/Farm Animals | <input checked="" type="checkbox"/> | | |

Required PPE & Safety Equipment– tick all that apply, write additional PPE required:

The yellow highlighted PPE are known required PPE at the time of compiling this document. This **does not negate** the need to assess for the appropriate required PPE measures at each sample location per visit.

| SAMPLING GLOVES | EAR PROTECTION | HARD HAT | SAFETY GLASSES / GOGGLES | WORK BOOTS / WADERS | PROTECTIVE GLOVES | PERSONAL FLOATATION DEVICE (PFD) |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| HI VIZ | SAFETY HARNESS | SUN BLOCK & HAND SANITISER | VHF RADIO | THROW BAG | PERSONAL LOCATOR BEACON | |
|  |  | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |

| Known Hazard | Significant | | Can it be Eliminated | | Can it be Isolated | | Method of control |
|--------------------------------|-------------|----|----------------------|----|--------------------|----|--|
| | Yes | No | Yes | No | Yes | No | |
| Drowning | ✓ | | | ✓ | | ✓ | Staff should use a sample pole if access into the river/stream is unsafe. PFD's must be worn by staff. Always carry a throw bag when working around water and have a personal locator beacon on hand. It is always preferable to have someone else with you at all times when working around water [HMP 18] |
| UV Radiation | ✓ | | | ✓ | ✓ | | Horizons provide sunscreen and hats. Staff are encouraged to make use of these. [HMP 17] |
| Difficult Entry/Exit | ✓ | | | ✓ | ✓ | | Entry and exit into waterways poses many risks and should be treated with caution. Sampling must be done from stable level ground. Staff should use a sample pole if access into the river/stream is unsafe. PFD's must be worn by staff and staff must be trained for working around water. [HMP18] |
| Electrical-Low/High Voltage | ✓ | | | ✓ | ✓ | | Many of the rural sampling sites require traversing across farm paddocks equipped with electric fences that contain stock. If unknown, treat every farm fence as electric and avoid direct contact. Contact the landowner for advise on whether or not the fence is live and discuss alternative routes or options for avoiding the fence if possible. |
| Potential for Difficult Rescue | ✓ | | | ✓ | | ✓ | Sampling must always be done from stable level ground. Staff should use a sample pole if access into the river/stream is unsafe. PFD's must be worn by staff and staff must be trained for working around water. Vehicles must be driven a sensible distance from any river or pond edges. Always carry a throw bag when working around water and have a personal locator beacon on hand. It is always preferable to have someone else with you at all times when working around water [HMP18] |
| Trip Hazards | ✓ | | | ✓ | ✓ | | Prior to sampling, staff must check area is clear of items that pose a risk. Trip Hazards should only be moved if safe to do so. Sampling only to commence if the sampler is satisfied that any slip, trip or fall hazards are isolated. |
| Slippery Surfaces | ✓ | | | ✓ | ✓ | | Sampling must be done from stable level. Vehicles must be driven a sensible distance from any river or pond edges. [HMP 18]. Staff driving four wheel drive vehicles must have adequate training [HMP 9] |
| Manual Handling | ✓ | | | ✓ | ✓ | | Staff must wear sampling gloves, eye protection and have access to anti-bacterial hand-gel to sample treated effluent. Hepatitis B vaccinations are offered by HRC. [HMP 30] [HMP 35] |

| Known Hazard | Significant | | Can it be Eliminated | | Can it be Isolated | | Method of control |
|-------------------------------|-------------|----|----------------------|----|--------------------|----|--|
| | Yes | No | Yes | No | Yes | No | |
| Traffic Vehicle Movements | | | | | | | The designated driver of a vehicle is responsible for ensuring the safety and operational requirements and recommendations are met. All staff working within the road reserve must wear high visibility clothing to AS/NZS 1906.4:2010. This clothing must be fluorescent red orange in colour unless the individual is the site STMS then the garment must be fluorescent lime yellow. [HMP 9] [HMP 16] [HMP 20]. |
| Stock/Farm Animals | ✓ | | | ✓ | ✓ | | Although generally docile, farm animals can still be hazardous. The risk should be isolated by finding alternative access routes to the sample location or contacting the owner for assistance. [HMP26] |
| Communications-Means of | | | | | | | Cell phone coverage is not available at all sites. Staff must be capable of communicating via VHF radio in an equipped vehicle. [HMP 24] |
| Remote Area | ✓ | | | ✓ | | ✓ | Most council vehicles are fitted with the E-Road vehicle locator system. Many vehicles are also fitted with a radio operating on the Horizons digital radio network providing communication and tracking coverages across a majority of the region. [HMP 24] |
| Temperature/ Weather Extremes | ✓ | | | ✓ | | ✓ | During the duration of a sampling run varying types and degrees of weather may be experienced. All sampling staff are to have access within their HRC vehicle to additional and appropriate clothing. Staff must have access to suitable PPE and spare clothing within their vehicle. [HMP 18] |
| Reduced Visibility | ✓ | | | ✓ | | ✓ | If you find you are driving in limited visibility slow your driving speed and turn your fog lights on and watch out for vehicles that aren't using their lights. When working in limited visibility if you cease to be able to make out your surrounding environment stop work immediately. If working at night it is advisable to traverse the property in daylight first to map out an action plan outlining walking tracks, vehicle tracks, fence lines, stock positions, ponds, waterways, houses, and sheds as well as other significant items of interest. [HMP12] |

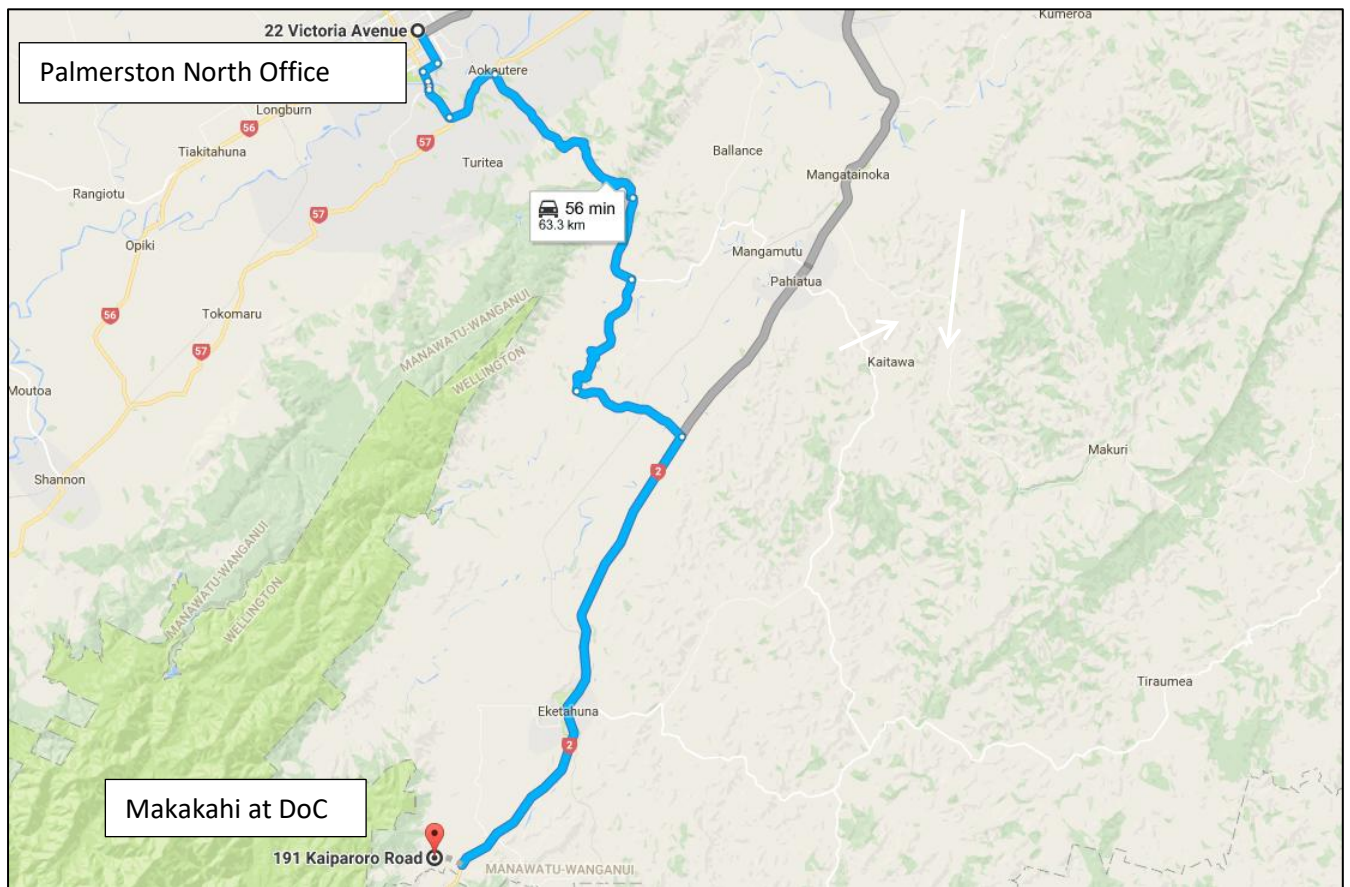
Site Information

| Hilltop Site Name | Easting/Long (NZTM) | Northing/Lat (NZTM) |
|---|---------------------|---------------------|
| Makakahi at DoC | 1819443 | 5489677 |
| Makakahi at Hamua | 1832423 | 5505922 |
| Mangatainoka at Hukanui | 1830088 | 5506101 |
| Mangatainoka @ Scarborough Konini Rd | 1837113 | 5515781 |
| Mangatainoka @ u/s Pahiatua STP | 1841138 | 5519827 |
| Mangatainoka @ d/s Pahiatua STP | 1841138 | 5519827 |

Equipment Required

| | |
|------------------|---|
| Equipment | <ul style="list-style-type: none">• Camera and GPS• Kick net• Invertebrate Pottles and Propan-2-ol• White plastic tray• Metal ruler• Gravelometer• Sampling Worksheet and Pencil• Bathoscope / Viewer• Scrubbing brush, tooth brush, washer bottle, yellow sample bottle lid and ice cream container• Pottles (Approx 10), chilly bins and ice-packs• Personal Locator Beacon• 4WD Vehicle equipped with VHF Radio• Throw Bag |
|------------------|---|

SITE LOCATION MAP – Makakahi at end Kaiparoro Road (DoC)



POSSIBLE SITE HAZARDS (this does not negate undertaking a hazard review prior to sampling on the day):

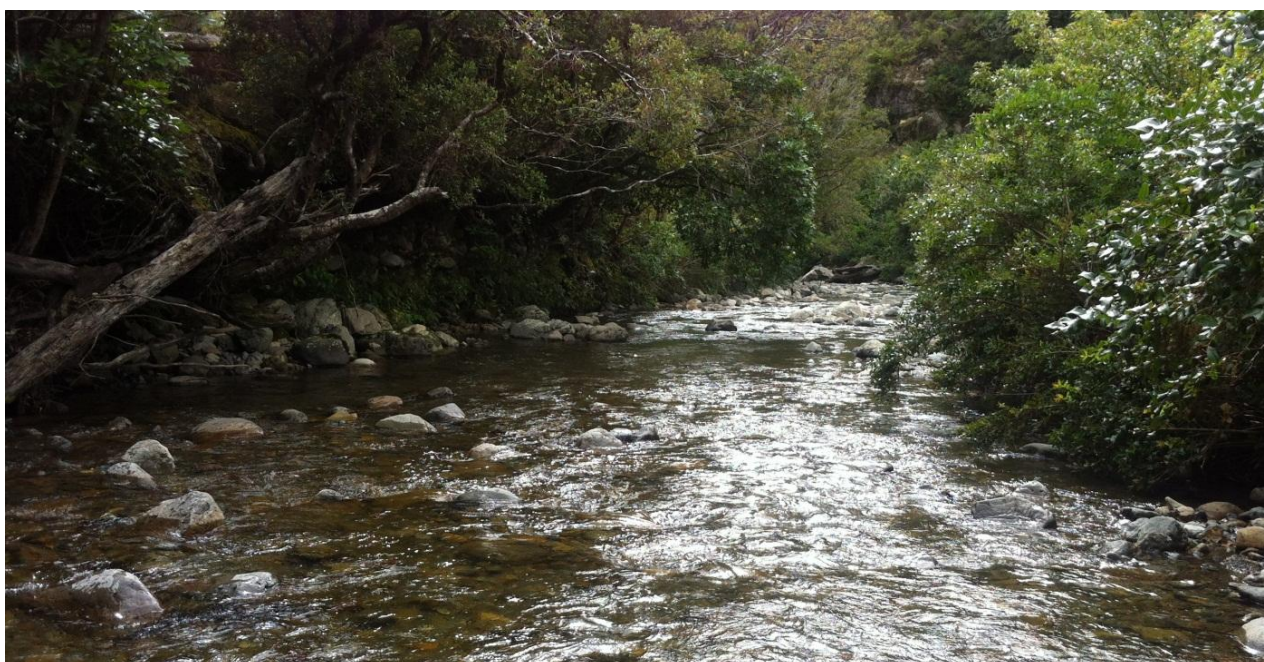
| | | | |
|------------------------------|--------------------------------|-------------------|-----------------------------|
| Drowning | UV Radiation | Slippery surfaces | Trip hazards |
| Difficult entry/exit | Potential for difficult rescue | Remote Area | Traffic / Vehicle Movements |
| Weather/Temperature Extremes | Communication | | |

REQUIRED PPE (in accordance with above hazards – this does not negate undertaking a hazard review prior to sampling on the day and/or using additional PPE if deemed necessary):

| | | | | | | | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|
| WORK BOOTS / WADERS | PFD | SUNSCREEN & HAND SANITISER | PERSONAL LOCATOR BEACON | THROW BAG | VHF RADIO | HI-VIS | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|

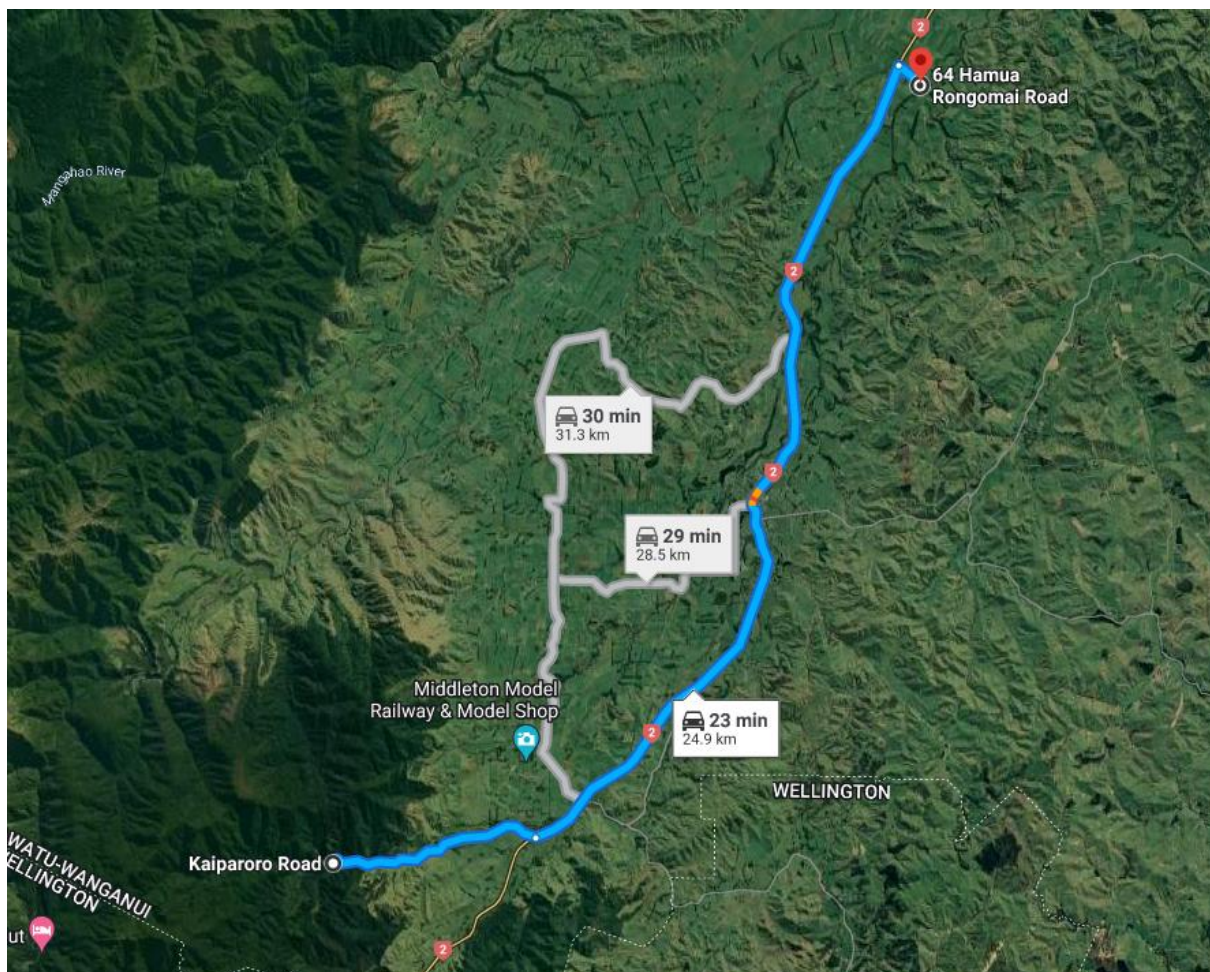
DIRECTIONS:

- From the Palmerston North Office travel south-east out of Palmerston North on SH57 towards Aokautere (towards Summerhill). Travel along Summerhill Drive, this will eventually turn into Aokautere Drive. Continue straight until you see Pahiatua-Aokautere Road on the right. Take this turn.
- Continue along Pahiatua-Aokautere Road, it will eventually turn into Makomako Road. Keep following this road straight for about 15 minutes until you see Nikau Road on the right. Take this turn.
- Follow Nikau Road, this will eventually turn into Tutaekaea Road. Follow Tutaekaea Road until you reach the junction with SH2. Turn right onto SH2.
- Follow SH2 to Ekektahuna. Approximately 5 minutes after Eketahuna you pass an ad sign for Mt Bruce with a white Kiwi. Continue for about 1km until you see Kaiparoro Rd on the right. Take this turn.
- Follow Kaiparoro Rd for about 5km until you reach an open area with the Makakahi to your right. Kaiparoro Rd continues further but becomes much smaller. Park here.
- Cross the river and walk upstream around the bend and find a riffle to sample.



Makakahi at DoC looking downstream.

SITE LOCATION MAP – Makakahi at Hamua



POSSIBLE SITE HAZARDS (this does not negate undertaking a hazard review prior to sampling on the day):

| | | | |
|------------------------------|--------------------------------|-------------------|-----------------------------|
| Drowning | UV Radiation | Slippery surfaces | Trip hazards |
| Difficult entry/exit | Potential for difficult rescue | Remote Area | Traffic / Vehicle Movements |
| Weather/Temperature Extremes | Communication | | |

REQUIRED PPE (in accordance with above hazards – this does not negate undertaking a hazard review prior to sampling on the day and/or using additional PPE if deemed necessary):

| | | | | | | | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|
| WORK BOOTS / WADERS | PFD | SUNSCREEN & HAND SANITISER | PERSONAL LOCATOR BEACON | THROW BAG | VHF RADIO | HI-VIS | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|

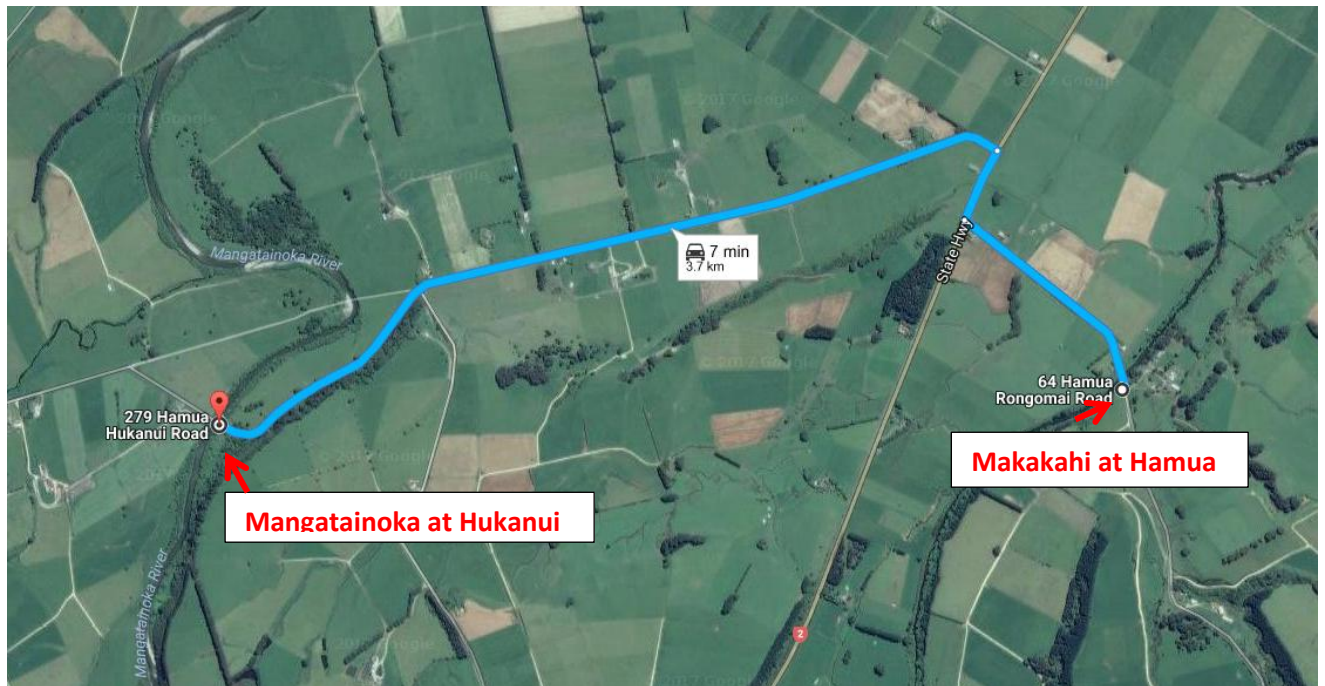
DIRECTIONS:

- From the Makakahi at DOC site, turn around and drive back the way you came along Kaiparoro Road towards SH2.
- At the end of the road turn left onto SH2 and stay on SH2 for approximately 19km, continuing through Eketāhuna

- After 19km you should come up to a road on your right called Hamua Rongomai Rd, take this right. (Sometimes it can be hard to see, there is a large two story house on the corner of the road and signs pointing to Rongomai).
- Follow the road for a few hundred meters before you come to a bridge crossing the Makakahi River. Cross the bridge, turn around in the large driveway, drive back over the bridge and park on the left hand side of the road immediately after the bridge. See image below. Turn your flashy light on and wear high Vis.
- To access the sampling site, cross the road and climb over the white fence here (see below). Walk down to the hill to the sampling site.



SITE LOCATION MAP – Mangatainoka at Hukanui



POSSIBLE SITE HAZARDS (this does not negate undertaking a hazard review prior to sampling on the day):

| | | | |
|----------------------|--------------------------------|------------------------------|-----------------------------|
| Drowning | UV Radiation | Slippery surfaces | Trip hazards |
| Difficult entry/exit | Potential for difficult rescue | Weather/Temperature Extremes | Traffic / Vehicle Movements |

REQUIRED PPE (in accordance with above hazards – this does not negate undertaking a hazard review prior to sampling on the day and/or using additional PPE if deemed necessary):

| | | | | | | | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|
| WORK BOOTS / WADERS | PFD | SUNSCREEN & HAND SANITISER | PERSONAL LOCATOR BEACON | THROW BAG | VHF RADIO | HI-VIS | |
|---------------------|-----|----------------------------|-------------------------|-----------|-----------|--------|--|

DIRECTIONS:

- From Makakahi at Hamua head back the way you came to SH2 and turn right towards Pahiatua.
- 200m down the road is a green sign towards Hukanui on your left. Turn here into Hamua Hukanui Rd.
- Drive along Hamua-Hukanui Road for about 5 minutes until you get to the first bridge (which crosses the Mangatainoka River). Just before you cross the bridge turn left on a small path. That leads down to the river.
- Park here and sample just upstream of this point.
- Find a riffle to sample.



Hukanui looking downstream

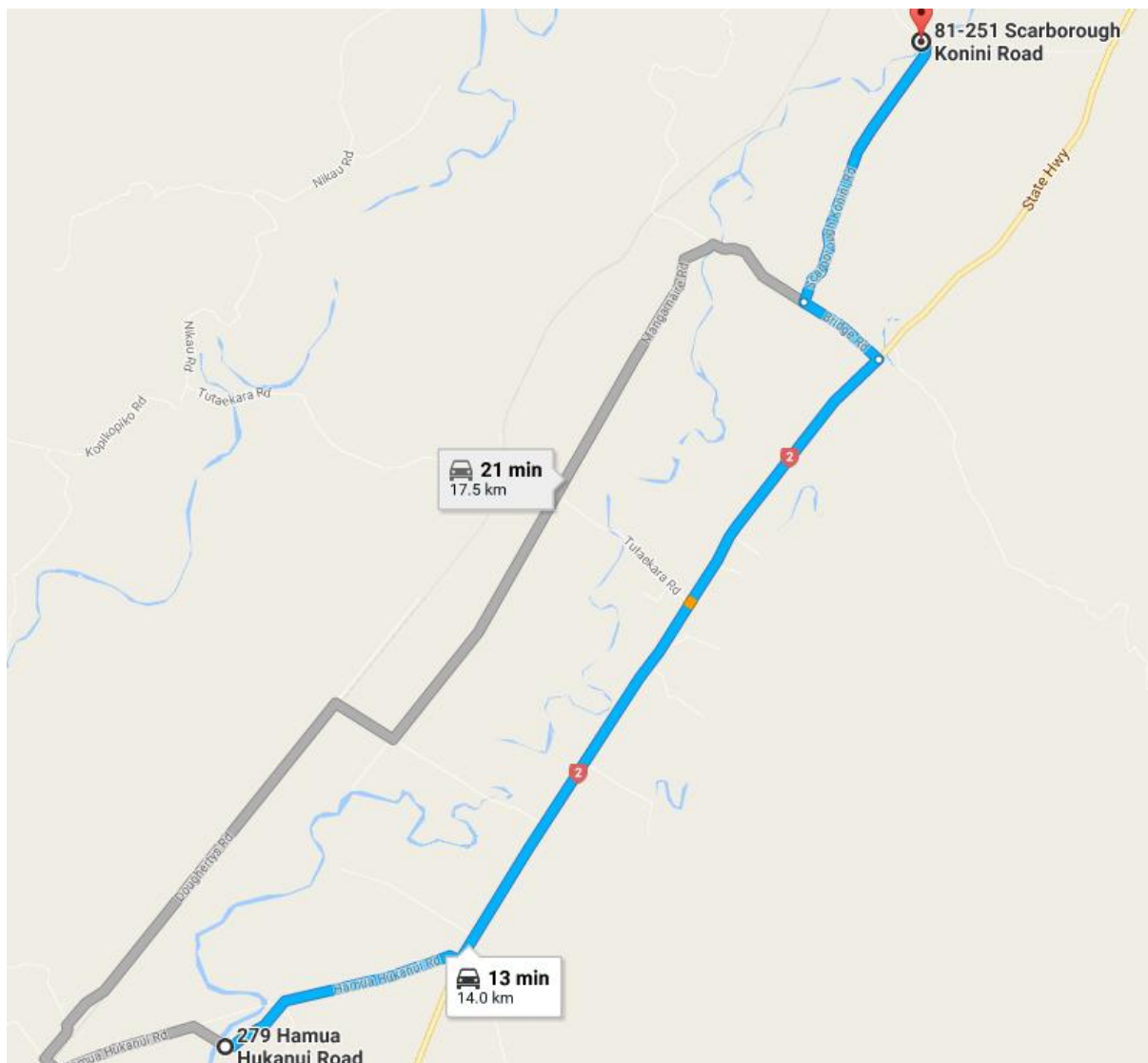


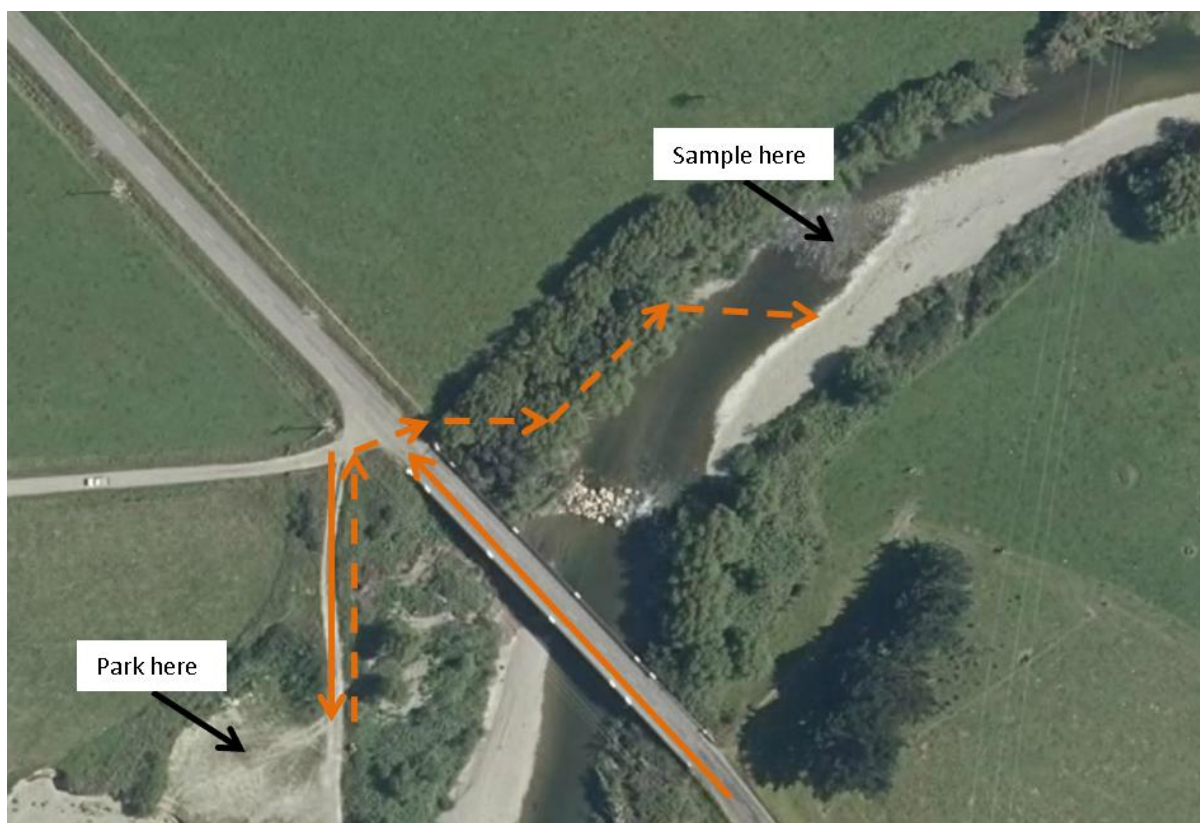
Hukanui lookin upstream

Mangatainoka @ Scarborough Konini Rd

13 min from previous site

- From Mangatainoka at Hukanui head back the way you came to SH2 and turn left towards Pahiatua and stay on the highway for 7.5km.
- Turn left into Bridge St (the first road on the left after you passed the green sign towards Mangamarie).
- The first road on your right will be Scarborough Konini Rd. Take this turn and stay on this road until you reach the first bridge (crossing the Mangatainoka).
- Immediately after crossing the bridge is a gravel path on your left leading towards the river. Go through the left gate. There is an open bit coming up, park here.
- Go back through the gate and cross the road. On the other side is a gate that you have to climb. There is a small track leading down to the river. You can cross the river shortly behind the weir. Take the samples in a suitable riffle.

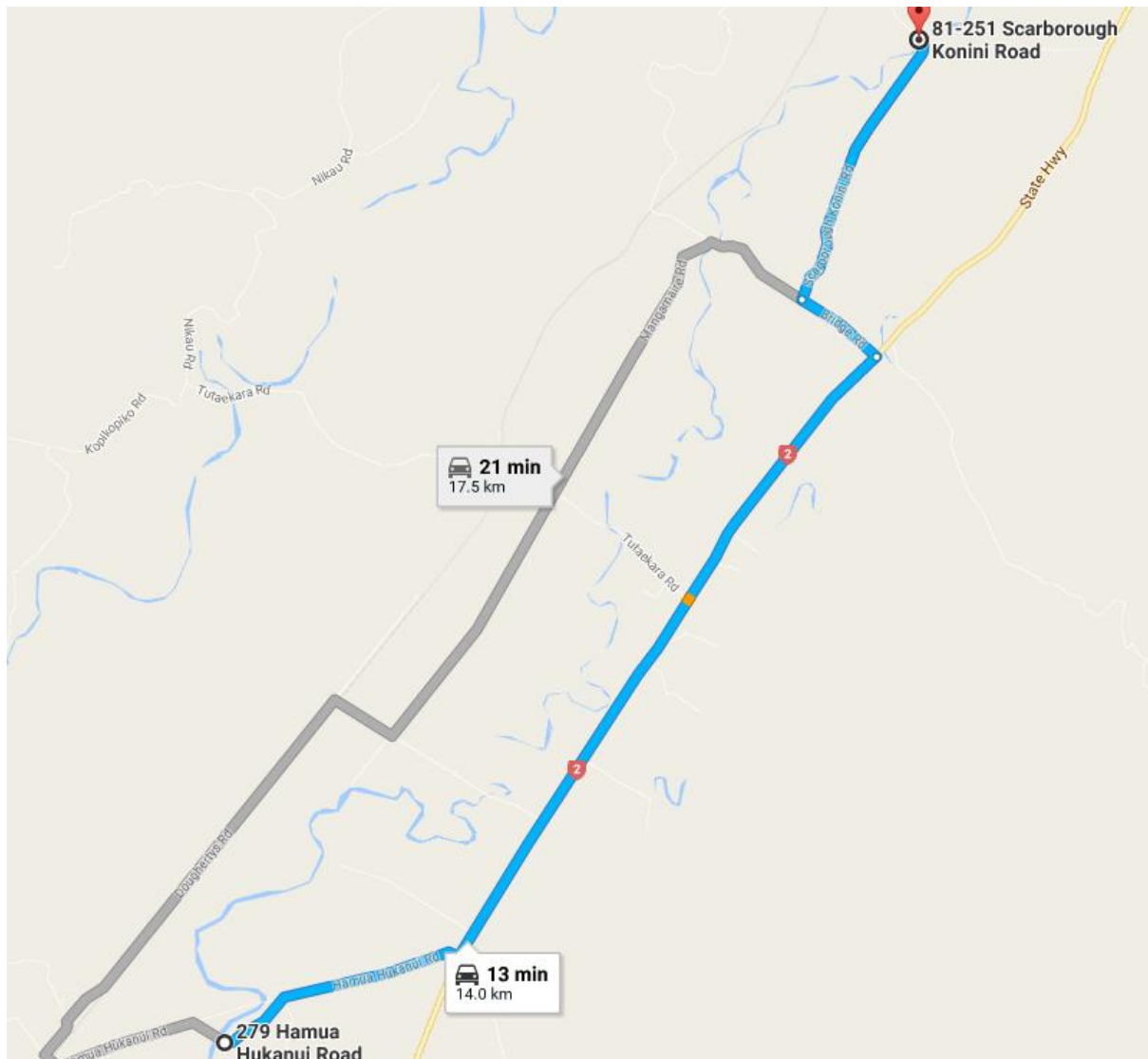


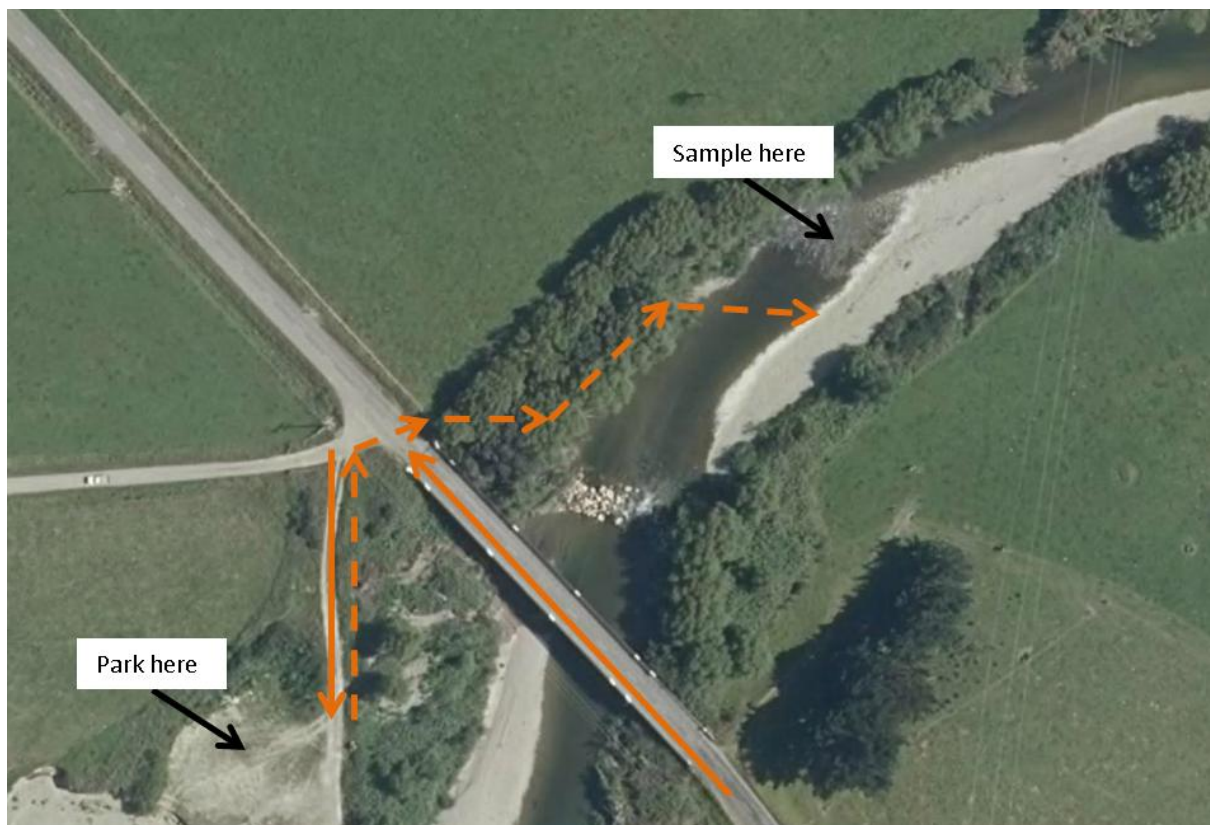


Mangatainoka @ Scarborough Konini Rd

13 min from previous site

- From Mangatainoka at Hukanui head back the way you came to SH2 and turn left towards Pahiatua and stay on the highway for 7.5km.
- Turn left into Bridge St (the first road on the left after you passed the green sign towards Mangamarie).
- The first road on your right will be Scarborough Konini Rd. Take this turn and stay on this road until you reach the first bridge (crossing the Mangatainoka).
- Immediately after crossing the bridge is a gravel path on your left leading towards the river. Go through the left gate. There is an open bit coming up, park here.
- Go back through the gate and cross the road. On the other side is a gate that you have to climb. There is a small track leading down to the river. You can cross the river shortly behind the weir. Take the samples in a suitable riffle.

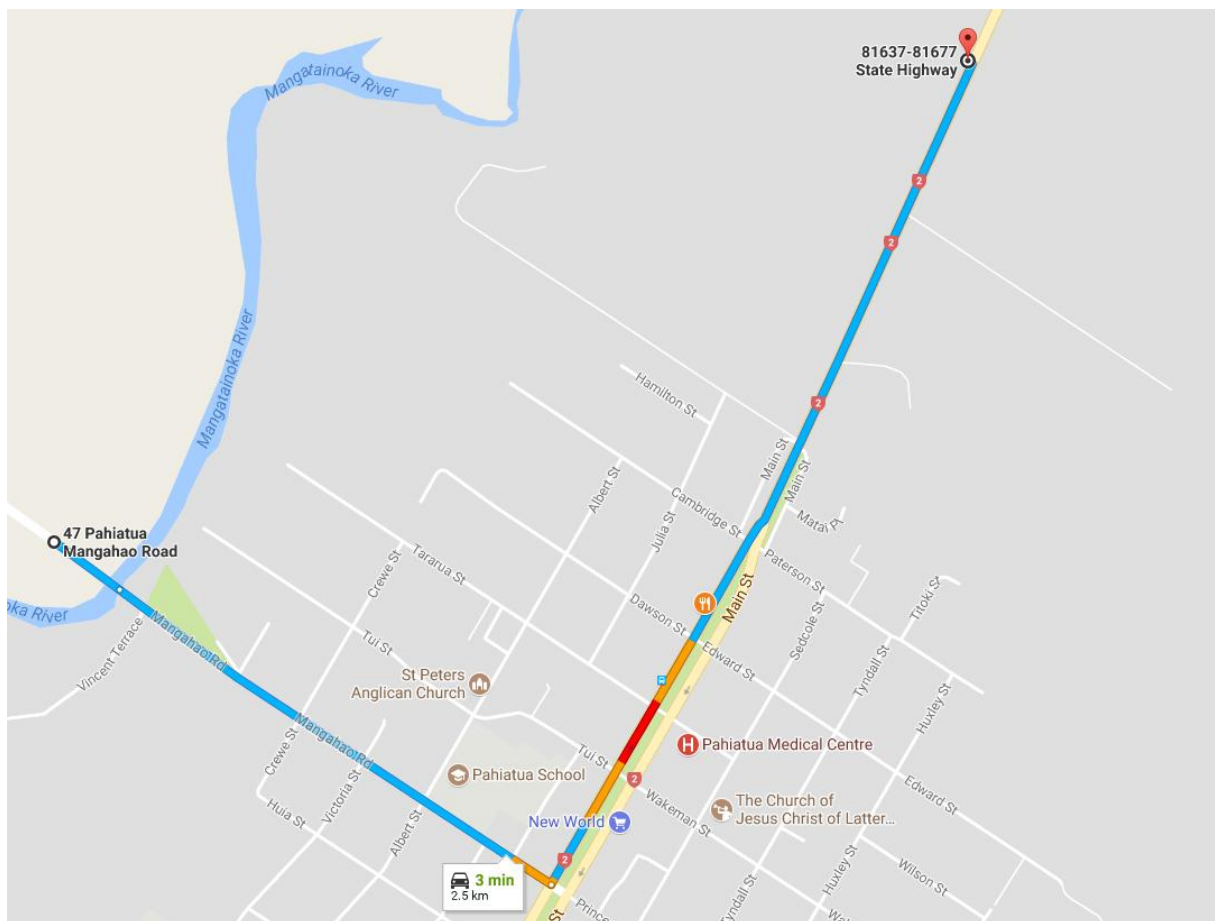


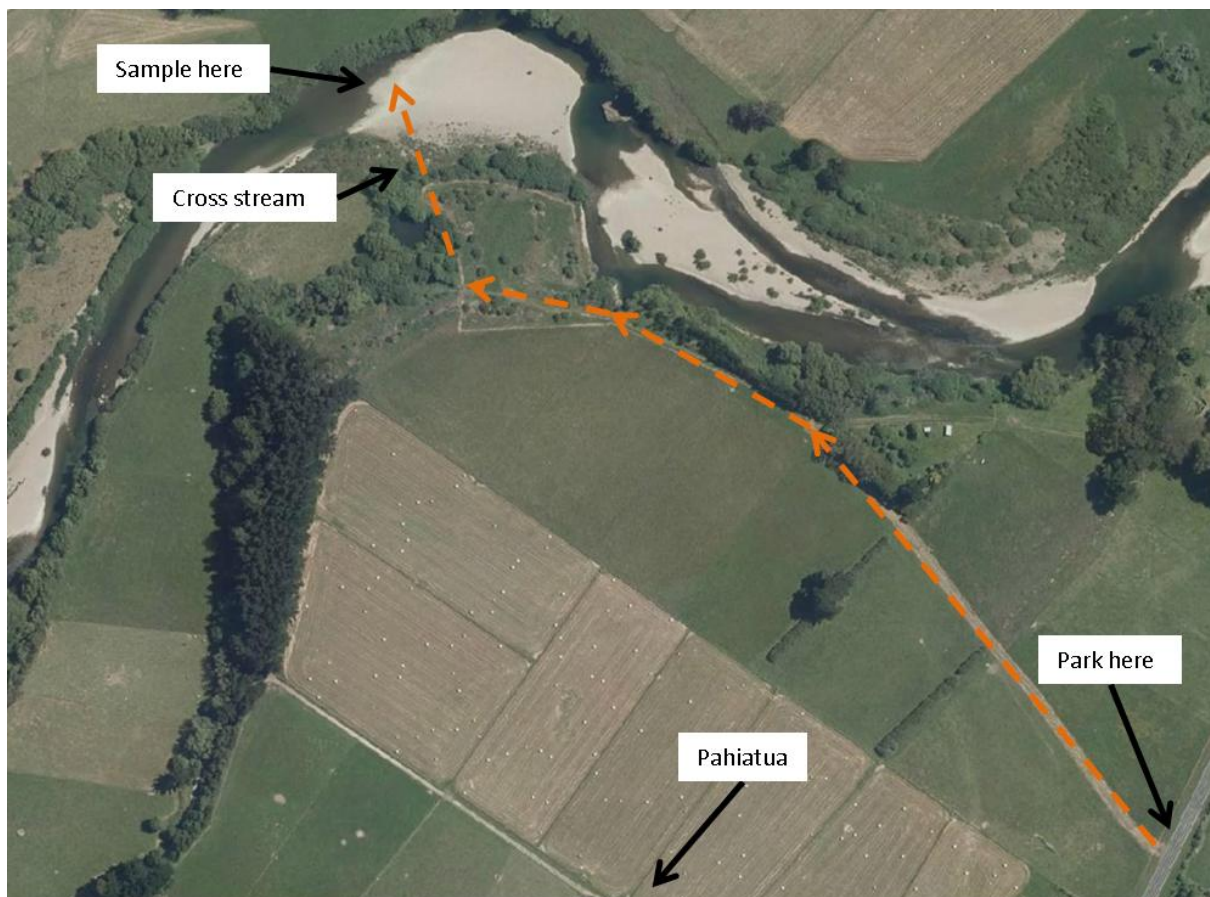


Mangatainoka @ u/s Pahiatua STP

3 min from previous site

- From Mangatainoka at Pahiatua Town Bridge continue over the bridge and turn left towards Woodville when you come up to SH2.
- Stay on SH2 for 1.5km. Approximately 500 metres past Pahiatua there is a farm gate on the left hand side of the road. This is the first farm gate on the left. This gate is locked, you will need to park as far to the side as possible and walk from here.
- From here follow the farm track until you get to a junction under tall pine trees where one track continues in relatively the same direction you walked, but has a slight left turn. Follow that track.
- The farm track will continue in a straight path until it dips down to a lower paddock and swoops slightly right. Keep following the track and then walk to the far Northern end of the paddock. You may see a slight clearing in the trees at the end of the paddock- this is where you make your way to the river.
- Walk through the trees towards the river. You will cross a small stream while in the trees. This stream is called Town Creek. This contains the outflow from the STP.
- Cross the STP outflow and head across the gravel towards to the river. Sample approximately 100 metres upstream of the confluence between Town Creek and the Mangatainoka River.





Mangatainoka @ d/s Pahiatua STP

- From the upstream site head downstream until you reach the confluence with Town Creek. Just upstream of the confluence there is a riffle that is safe to cross during moderate to low flows. Cross the river here to the gravel bar in the middle of the river. This is potentially difficult and potentially dangerous depending on the height of the river. Follow appropriate safety protocols.
- Carry on approximately 50 to 100 metres downstream of the discharge point (where Town Creek enters the Mangatainoka River). Sample in a suitable riffle.



