Repair Report on the leak on the Hastings WWTP Main Outfall Pipeline

Prepared for: **HASTINGS DISTRICT COUNCIL**

July 28, 2017

Revision	Description	Author		Quality Check		Independent Review	
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2	Final	G. Russell					

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Summary

On 22 July 2016 Hawke's Bay Regional Council monitoring staff reported a plume of final combined treated wastewater discharging into Hawke Bay located part way along the main outfall pipeline.

The Hastings District Council were notified of the leak and responded by undertaking a series of investigations and repairs.

The repair was subsequently completed on 10 November 2016.

The Repair Report documents the incident, repair and probable cause and actions required by the Hastings District Council to monitor and report on annual pipeline inspections.

1 Background

The Hastings Wastewater Treatment Plant (WWTP) has a number of resource consents in place to ensure its ongoing operation and maintenance, including the discharge of final combined treated wastewater into Hawke Bay.

The main coastal permit, CD130214W, provides for the discharge of final combined treated wastewater into Hawke Bay at East Clive via the long offshore outfall, at a rate not to exceed 2,800 litres per second (L/s). The long offshore outfall is 2,750 metre in length, with a diffuser outfall making up the last 300 metres of the pipeline. The domestic and non-separable industrial wastewater is treated at the WWTP. During dry weather wastewater is discharged at an average flow rate of approximately 600 L/s.

The wastewater system comprises two separate networks; (1) a domestic and non-separable industrial wastewater system and (2) a separated industrial wastewater system for trade waste (i.e. does not contain human exceta). The domestic wastewater initially passes through a gross solids screens and is then treated in two Biological Trickling Filter (BTF) tanks.

The industrial wastewater is treated on site at individual industrial premises (mostly food processing plants) and is then milliscreened at the WWTP before the two waste streams are combined and then passed through a grit trap to remove fine grit that may have passed through the screening process. The combined treated wastewater is then pumped out to sea via the long offshore outfall and disbursed into Hawke Bay via the 300m long diffuser at the end of the outfall pipeline.

This consent was granted in June 2014, and expires in May 2049.

2 Purpose

The purpose of the report is to provide the Hawke's Bay Regional Council (HBRC or Regional Council) with an Outfall Leak Repair Report, based on the investigation, repairs and works conducted on the long offshore outfall as a result of a leak to the main outfall pipeline.

The Repair Report closes out the leak incident that occurred in July 2016 and subsequently repaired in November 2016.

The sequence and timeline of events including investigations, repair works undertaken is set out in Appendix A.

3 Reported Incident

On 22 July 2016 Regional Council monitoring staff reported a plume of final combined wastewater discharging into Hawke Bay located part way along the pipeline. The leak was located approximately 1200 metres out to sea, near the mid-point of the outfall pipeline, at a water depth of approximately 8 metres.

Once the reported incident was bought to the attention of the Wastewater Treatment Manager (Bob McWilliams) and the Hawke's Bay District Health Board a series of steps were carried out to better identify the source and cause of the plume discharging at that location. This involved the identification and location of the leak.

3.1 Identification and Location of the Leak

The source of the plume was confirmed to be a leak in the main outfall pipe joint. The leak was found approximately 1200 metres off shore, at a midway point along the pipeline. This was confirmed following a dive inspection shortly after the leak was reported. The pipeline lies approximately 8 metres below the surface of the coastal water, and is approximately one metre embedded within the seabed.

3.2 Initial Repair Response

The Hastings District Council (HDC or Council) commissioned maintenance divers to investigate and repair the leak on 17 August 2016, however that attempt was unsuccessful. A second attempt made on 26 August 2016 slowed the flow but did not stop it. HDC commissioned OCEL, marine engineering experts, to assist with developing a repair methodology which involved:

- Investigation dive
- Air scour to expose pipe joint
- Remove old pipe joint band
- Replace with new stainless steel band

When carrying out the above repair the divers discovered steel supports beneath the pipe. The diver's halted works in case the steel supports were providing structural support from some earlier works. A temporary band was installed to stem the discharge from the joint. This is shown in the conceptual sketch below.

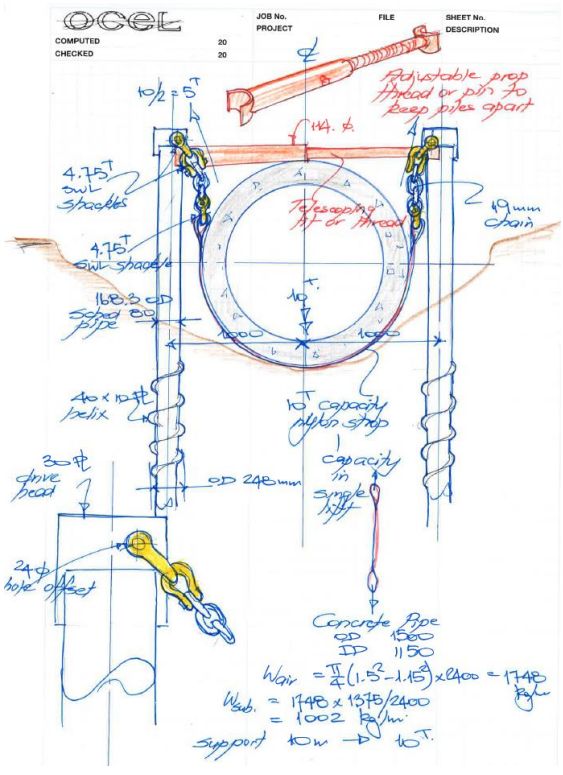


Figure 1 OCEL prepared concept sketch to repair joint leak

The installation of some support piles and strops for vertical support with the pipe excavated beneath were carried out with the intention to continue to have the outfall functioning.

3.3 Final Repair Response

The repair was subsequently completed on 10 November 2016.

Unknown engineering and 'as-built' information with the pipeline, developing a repair method, inclement weather and the need to ensure the safety of the dive and surface water crew hindered a more rapid response to investigate and repair the leak. HDC took a cautious and thorough approach to ensure a robust design, repair methodology and importantly ensure the safety of the dive repair teams.

4 Assessment of Risk to Public Health

Following the notification of the leak, Council commissioned a public health risk assessment.[1]

A microbial risk assessment conducted as part of the WWTP consent granted in 2014 concluded that;

'the average risk of infection is less than the 'Low observed adverse effects level' (LOAEL) where there is a detectable increase in risk level above the threshold for reported illness – equivalent to an average probability of five illnesses in every 100 exposures (i.e. between 1% and 5%)'.

In the context of the 2014 consent and this pipe leak at a location approximately the 1200 metres offshore, the public health risk assessment report (September 2016) states:

"The development of a leak at approximately the mid-point of the ocean outfall has changed the risk profile slightly in that the proportion of treated wastewater flow discharged at least 2,450m from shore has decreased from 100% to 97%, with the remaining 3% of flow being released 1,200m from shore. Despite this change, the risk of infection remains low for the following reasons:

- *While a measurable increase in the concentration of microorganisms is expected in the immediate vicinity of the leakage site, the effect on water quality further afield at the bathing beaches of Haumoana and Te Awanga, and a mussel bed at Te Awanga, will be far less, and probably not detectable.*
- *The leak has occurred during the winter period when the incidence of swimming, surfing and other primary contact recreational activities is low, as is the incidence of shellfish collection, which has greatly reduced the risk of exposure."*

[1] Assessment of public health risks associated with a leak in the Hastings WWTP main outfall pipeline (28 September 2016), prepared by MWH New Zealand Limited for Hastings District Council.

5 Potential Cause

From the damage observed by the divers during inspections, there is a high probability that the damage was caused by the pipe joint being struck by an object. This may have been caused by trawler boards (or otter boards) that act as a plough anchor to keep the nets close to the seabed.

See example pictures below.

Figure 2 Picture of trawler board

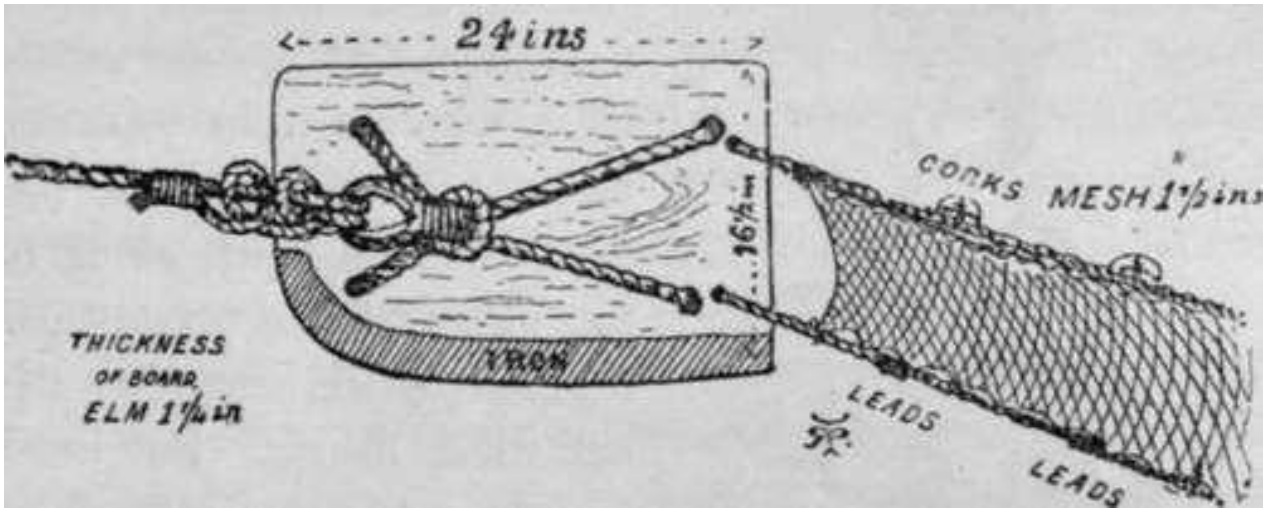


Figure 3 Diagram of trawler board

6 Abatement Notice

As some of the final combined treated wastewater was being discharged via a leak in the main outfall pipe and not via the 300m diffuser as consented under CD130214W, the Regional Council served an abatement notice[2] on Council on 18 October 2016.

The abatement notice requested the Council to take the following action:

i) Outline the process in which the longshore outfall pipeline will be checked /routinely inspected and provide reports to Hawke's Bay Regional Council after the checks/inspections are completed to ensure the discharge of contaminants is through the diffuser.

6.1 Resolution of the Abatement Notice

The abatement notice was subsequently cancelled on or about the 30 October 2016, as the intent of Condition 30 and 31 of CD130214W was considered the appropriate mechanism to action and report on the leak, investigation, repair of the leak in the main outfall pipeline, rather than comply with the abatement notice.

7 Repair Outcome

From the time the leak was identified in late July to early November when it was repaired, a series of events and actions including investigation, repair optioneering, detailed repair methodology planning, dive and crew mobilisation, repair works completion and testing.

Appendix A sets out the detailed sequence and timeline of events.

8 Future Actions

The following actions shall be carried out by the Council.

- Council are to conduct 'sail/drive over' inspections of the main outfall pipeline on a quarterly basis to monitor from the water surface any visible leaks to the main outfall pipeline.
- The Council shall undertake annual inspections of the diffuser (i.e. this being the 300 metre section of the pipeline).[3] The inspections are required by Condition 9, and reported on under Condition 24 of CD130214W. This activity will take place as part of the quarterly outfall sampling programme and be reported on in the Annual Monitoring Report.

[2] HBRC ref. ER2016.0521

[3] The extent of this action is covered by the consent conditions for the outfall diffusers, CL150176Oa, CL150177E and CL150178Ca.

9 References

Assessment of public health risks associated with a leak in the Hastings WWTP main outfall pipeline (28 September 2016), prepared by MWH New Zealand Limited for Hastings District Council.

Coastal Permit (CD130214W) to discharge final combined wastewater into Hawke Bay at East Clive via the long offshore outfall.

Coastal Permits (CD150176Oa, CL150177Ea and CL150178Ca), to occupy the coastal marine area with a 300m replacement outfall diffuser, to demolish and remove a 300 m section of the existing outfall in the coastal marine area and to erect a 300 m replacement outfall diffuser in the coastal marine area.

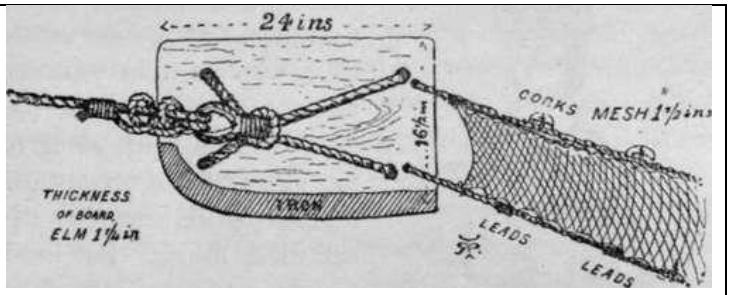
APPENDIX

Appendix A: Timeline of Events

Type	Date	Time	Comment
Works	22 July 2016		HBRC monitoring staff detect wastewater plume while conducting routine sampling and monitoring. This detection is brought to the attention of HDC (Bob McWilliams). HBRC also informed DHB.
Phone	22 July 2016		DHB (Teresa?) contacted HDC (Bob McWilliams) to confirm incident. HDC considered the small leak was not a significant public health risk. DHB agreed to inform the Medical Officer and to call back HDC if their assessment differed. No call back was received.
Works	Late July 2016		An initial sub-marine investigation of the leak to ascertain the extent of damage was carried out.
Works	17 August 2016		This work involved the excavation of the pipe joint. The excavation revealed steel beams beneath the pipe. A cautious approach was taken so as not to further damage the outfall pipeline and the repair works were postponed in order to reassess the situation.
Works	26 August 2016		Initial pipe joint repair with a steel band was undertaken with limited success, due to location of the steel beams.
Works	1-2 September 2016		Temporary steel band on damaged pipeline collar installed and leak flow was reduced.
Email	2 September 2016	4.44pm	HBRC (Andrew Gass) provided with email update from HDC (David James) on the repair works.
Email	26 September 2016	3.20pm	HDC (Nick Cottier) instructs MWH (David Cameron) *"… to produce a short internal report for HDC to describe the public health risk or lack of."*
Report	28 September 2016		MWH report prepared for Hastings District Council: "Assessment of Public Health Risk Associated with Leak in the Hastings WWTP main outfall pipeline."
Email	28 September 2016	12.18pm	A sampling regime from MWH (David Cameron) was agreed that involved marine collection of 5 samples located equidistant around a 100m radius circle, centred on the leak. Test for enterococci and faecal coliforms.
Letter	28 September 2016		Permitted activity (Rule 118) interpretation for repair and maintenance work on the leak sent to HBRC to confirm.
Email	11 October 2016	8.45am	HBRC (Andrew Gass) requested update on permanent repair work from HDC (David James).

Email	12 October 2016	1.51pm	Follow-up on Permitted activity interpretation letter to HBRC.
Email	12 October 2016	3.11pm	HBRC (Consent - Charlotte Drury) forwarded to HBRC (Compliance – Andrew Gass) their confirmation that the repair and maintenance work on the lawfully established structure is indeed a permitted activity.
Email	13 October 2016	11.49am	HDC (David James) provide update to HBRC (Wayne Wright and Andrew Gass) on leak repair.
Phone	13 October 2016	4.24pm	HBRC (Andrew Gass) telephone HDC (David James) to inform HDC of a pending Abatement Notice in relation to the outfall pipeline damage.
Email	14 October 2016	9.12am	Confirmation from HBRC (Consent - Charlotte Drury) that the repair and maintenance works on the outfall pipeline is a permitted activity.
Letter	17 October 2016		HBRC prepare and send out Covering letter and Abatement Notice dated 17 October 2016.
Letter	18 October 2016		HDC (David James) receive HDC date stamped Abatement Notice; scanned to TRIM WAT-5-03-16-413. The date of 18th was struck-out and a handwritten 19th was inserted.
Letter	19 October 2016		HDC (Wastewater Manager David James) receives hard copy of HBRC Covering letter and Abatement Notice.
Works	19 October 2016		MWH conduct a collection of 5 samples located equidistant around a 100m and 300m radius circle, centred on the leak. Samples were couriered overnight to Hills Laboratory for analysis.
Email	19 October 2016	4.28pm	HDC (David James) provides HBRC (Andrew Gass) with update on the leak repair, as per Condition 30.
Works	25 October 2016		Maintenance divers mobilise to site and conduct extensive health and safety briefing.
Works	26 October 2016		Repair works commence.
Email	26 October 2016	10.07am	Marine sample results from Hills Laboratory received.
Email	26 October 2016	1.46pm	Marine sample results reported on by MWH.
Works	27 October to 11 November 2016 (estimated)		Pipeline repairs continue with expected completion for early to mid-November, weather permitting. Due to poor weather conditions and safety requirements the programme of repairs were pushed out to week end 11 November.
Letter	28 October 2016	3.17pm	HDC reply to HBRC ER2016:0521 *'WWTP Longshore Outfall - Provision of Report and Request to Cancel Abatement Notice'*. The letter provided replies in line

			with Conditions 30 and 31 and a request to cancel the Abatement Notice.
Works	2 November 2016		As a result of calmer weather, maintenance divers mobilised to site and re-commence pipeline repair work.
Works	3 November 2016		Piles are driven into seabed and straps beneath the pipeline installed.
Works	4 November 2016		Additional pipeline repairs continues.
Works	7 November 2016		Diving activities have been aborted today due to risk to safety of workers and equipment due to poor sea conditions and forecast. Dive team on standby and took opportunity to glue rubber to the two remaining strengthening covers for the damaged collars.
Email	9 November 2016	10.49am	HBRC (Andrew Gass) provided with email update from HDC (David James) on the repair works.
Email	10 November 2016	11.20am	HBRC (Andrew Gass) provided with email update from HDC (David James) on the repair works. The email noted the following: "*The repair works have been successfully completed, the newly replaced bands are in place and are not leaking. The divers are doing final completion works today. From the damage observed there is a high probability that it was caused by trawler boards (or otter boards), that act as a plough anchor to keep the nets close to the seabed. See example pictures below.* 

			 *We are thinking about what control measures we could put in place to minimise the risks of this type of damage in the future. A repair works report will submit to you (HBRC) in due course.*"