7.5 Asset Creation

7.5.1 Asset Creation

This activity is the creation of a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its current capacity or performance in response to changes in demands or customer expectations.

Assets are acquired as a result of:

- Meeting new standards required by policies and legislation (e.g. additional treatment facilities to meet new resource consent conditions)
- Taking over new reticulation constructed with sub-divisional development (constructed at the developer's expense)
- Extensions constructed by Council to service new areas
- Providing additional system capacity to overcome inadequacies or provide for growth and future demands (e.g. larger pipes, pumps, and treatment capacity)

Projects are assessed prior to any decision to proceed by carrying out an economic appraisal using whole of life cost/benefit analysis techniques which take into account:

- Capital costs of various options
- Any change in net annual operating costs
- Any change in annual maintenance requirements
- Any salvage value of existing assets or components
- Any impact on the longer term strategic direction of the network

The selection criteria for prioritising and programming of asset development projects is a function of consideration of risk, costs and benefits, affordability and ranking with other projects

7.5.2 Financial Strategy for Council to meet Full DWSNZ Compliance

The Council is strongly committed to providing safe, secure and affordable drinking water throughout all 19 district-wide water schemes. In 2012, with a goal to taking all practical steps to meet DWSNZ, it was calculated that to meet full drinking water standards for all Councils water schemes, the District would have to invest over $14,000,000 in capital improvements works alone. This, given Council's small rating base, reasonable deprivation index and a central government drive to reduce overall debt and keep rate increases to a minimum, was just too unaffordable.

Thus a three-stage strategy was adopted, so that Council remained committed to meeting DWSNZ compliance, but still looking to raise the bar in terms of safe, secure and affordable drinking water provision. Firstly; were the installation of nine new MIOX plants and the re-location of an existing MIOX plant, in such a manner as to ensure bacteriological DWS MAV compliance for all water schemes at all times, thus lifting the eight currently in-place Permanent Boil Water Notices across the district. Secondly; the Council has approved the change of the current targeted rate system to a fully district-wide rating system across all schemes (LTP 2015-2025) for the provision of drinking water, starting 2015/2016. This proposal will insulate communities from any sudden and potentially unaffordable costly rate increases when capital works are required to meet regulatory standards. Thirdly; the Council is introducing a new, staged rating-system for water asset depreciation funding (LTP 2015-2025), so as to help reduce our current level of prevailing debt (related to previous water assets replacements and new installations) and thus make the targeted installation of designed treatment processes to meet full DWSNZ more affordable in the near future (fully compliant capital installation in 2024/2025 (for all minor schemes); in 2025/2026 (for all small schemes); and in 2026/2027 (for all neighbourhood schemes)). This includes for a rationale that advanced technology to meet full DWSNZ compliance will become efficient and effective, and thus optimistically less-expensive as time goes on.

In 2017 Council engaged Opus International Consultants to provide an independent updated budget estimate for achieving protozoal compliance. The Water Treatment Budget Estimates 2017 report provided a budget estimate of $15.7M (see Table 5-6). This includes an allowance for wastewater handling and disposal systems and 30% contingencies, but excludes professional services. Council

have increased the budgets based on the latest costs in the 2017 report and have brought works forward to begin in 2022. Council are currently reviewing the report as well as considering procurement options for implementing the district wide upgrades.

7.5.3 Future Capital Works

Table 7-12 details the capital expenditure requirement for the period 2018/19 to 2027/28.

Table 7-12: Capital Expenditure ($,000)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Amberley										
New asset connections & improvements	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5
Improved supply resilience (new storage, treatment, pumps & 5km water main – RC Rd)	950	-	-	-	-	-	-	-	-	-
5ML Reservoir (planning, design and build)	-	-	-	-	-	-	-	100	400	2500
Hydraulic model rebuild	20	-	-	-	-	-	-	-	-	-
Age testing bores (SH1) WSP	2.5	-	-	-	-	-	-	-	-	-
Well head inspection (SH1) WSP	-	2.5	-	-	-	-	-	-	-	-
Subtotal	**1050**	**80**	**77.5**	**77.5**	**77.5**	**77.5**	**77.5**	**177.5**	**477.5**	**2577.5**
Ashley Rural										
New asset connections & improvements	190	190	190	190	190	190	190	190	190	190
Hydraulic model build	50	-	-	-	-	-	-	-	-	-
Stewarts Line – Forestry Res to Henrys Ford	592	-	-	-	-	-	-	-	-	-
Loburn Rising Main Replacement (Pound Road to Chapel Road)	-	390	-	-	-	-	-	-	-	-
Loburn Rising Main Replacement (Chapel Road to Yaxleys/Stoneyflat Rd Jcn)	-	-	540	-	-	-	-	-	-	-
Cones Road to Henrys Road Ring Main	-	-	-	428	-	428	-	428	-	428
Rangiora Leithfield Road Upgrade (Amors Rd to Pembertons 2.5km)	-	-	-	-	337.5	-	-	-	-	-
Age testing bores (Leithfield Beach/Kowai) WSP	2.5	-	-	-	-	2.5	-	-	-	-
Well head inspection (Leithfield Beach /Kowai) WSP	-	5.0	-	-	-	-	5.0	-	-	-
Well head inspection (RC Rd) WSP	-	-	-	2.5	-	-	-	-	2.5	-
Subtotal	**834.5**	**585**	**730**	**620.5**	**527.5**	**620.5**	**195**	**618**	**192.5**	**618**
Culverden										
New asset connections & improvements	20	20	20	20	20	20	20	20	20	20

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Additional storage and source options assessment	20	130	500	-	-	-	-	-	-	-
Age testing bore	2.5	-	-	-	-	2.5	-	-	-	-
Well head inspection	-	5	-	-	-	-	5	-	-	-
Subtotal	**42.5**	**155**	**520**	**20**	**20**	**22.5**	**25**	**20**	**20**	**20**
Waiau Township										
New asset connections & improvements	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
EQ event related/WSP Reinstate reservoir storage	126.6	-	-	-	-	-	-	-	-	-
WSP Permanent Generator for Treatment shed Portable generator for Amuri-Waiau area that will service the township intake	-	30	-	-	-	-	-	-	-	-
Subtotal	**134.1**	**37.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**
Amuri Plains										
New asset connections & improvements	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Reservoir Upgrade	-	105	-	-	-	-	-	-	-	-
Hydraulic model build	-	10	-	-	-	-	-	-	-	-
Subtotal	**12.5**	**127.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**
Balmoral										
New asset connections & improvements	10	10	10	10	10	10	10	10	10	10
Hydraulic Model Build	-	10	-	-	-	-	-	-	-	-
WSP Install dedicated generator for treatment shed	12	-	-	-	-	-	-	-	-	-
DWSNZ Full Compliance Works (Investigation Y3&4/Works Y7/Y9)	-	-	32	64	-	-	20	-	1024	-
Subtotal	**22**	**20**	**42**	**74**	**10**	**10**	**30**	**10**	**1034**	**10**
Waiau RWS										
New asset connections & improvements	5	5	5	5	5	5	5	5	5	5
EQ related works – Intake/U Highfield/Sherwood Res	150.6	-	-	-	-	-	-	-	-	-
Hydraulic model build	-	20	-	-	-	-	-	-	-	-

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Subtotal	**155.6**	**25**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
Cheviot										
New asset connections & improvements	45	45	45	45	45	45	45	45	45	45
Cheviot Main reservoir upgrade	-	-	100	-	-	-	-	-	-	-
Cheviot Main Pipe upgrade (225mm Main Res to Barnes Junction)	-	-	-	-	-	-	-	780	-	-
Cheviot Main Pipe upgrade (Domett including SH1 crossing)	-	64.4	-	-	-	-	-	-	-	-
Cheviot Main Pipe upgrade (Port Robinson improvements)	-	-	21	-	-	-	-	-	-	-
Cheviot Main Gore Bay COMS Improvements	16	-	-	-	-	-	-	-	-	-
Blythe intake flood protection/access	-	-	5	30	-	-	-	-	-	-
Parnassus Booster PS upgrade & reservoir security works	-	20	20	-	-	-	-	-	-	-
Hydraulic model build	20	20	-	-	-	-	-	-	-	-
WSP Repair or replace old reservoirs One Tree Hill/Hendersons	15	-	-	-	-	-	-	-	-	-
EQ related works – Kulnine/Bush/Wilkinsons (Parnassus)	25.3	-	-	-	-	-	-	-	-	-
EQ related works – Record Booster/Well No 3 (Cheviot)	11.1	-	-	-	-	-	-	-	-	-
EQ related works – Mt Styche/Random Spur (Kaiwara)	49.1	-	-	-	-	-	-	-	-	-
Subtotal	**181.5**	**149.4**	**191**	**75**	**45**	**45**	**45**	**825**	**45**	**45**
Waipara Township										
New asset connections & improvements	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Intake land purchase	-	-	-	150	-		-	-	-	-
Additional reservoir storage & new booster pumps	-	-	-	-	100		-	-	-	-
Age testing bore			2.5					2.5		
Well head inspection					2.5					2.5
Subtotal	**12.5**	**12.5**	**15**	**162.5**	**115**	**12.5**	**12.5**	**15**	**12.5**	**15**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Hanmer Springs										
New asset connections & improvements	40	40	40	40	40	40	40	40	40	40
Treatment process upgrade (Floc/UV)	60	120	-	-	-	-	-	-	-	-
Hydraulic model build	10	-	-	-	-	-	-	-	-	-
WSP Thomas Hanmer Drive Reservoir assessment	20	150	-	-	-	-	-	-	-	-
Subtotal	**130**	**310**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Hawarden-Waikari										
New asset connections & improvements	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Bishells Road Watermain replacement (3.1km of 150mm PVC)	560	-	-	-	-	-	-	-	-	-
Resilience of supply (investigation into storage)	20	-	-	-	-	-	-	-	-	-
Hydraulic model build	10	-	-	-	-	-	-	-	-	-
Subtotal	**607.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**
Hurunui Rural										
New asset connections & improvements	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Standby generator Hurunui No1 intake (include pad & cabling)	-	-	-	-	105	-	-	-	-	-
Water source review (deep bore options) – UW, LW, Peaks	-	75	-	-	-	-	-	-	-	-
Lower Waitohi – McRaes Rd LoS upgrade (125mm river crossings)	30	-	-	-	-	-	-	-	-	-
Lower Waitohi – mainline LoS upgrade (3km of 110mm PN12/PN16)	390	-	-	-	-	-	-	-	-	-
Mt Alex pipe upgrade (2.5km booster to Res 90mm PN16)	-	-	-	-	82.5	-	-	-	-	-
Motunau Beach Watermain (d/s of Res 2km 90mm PN12)	71	-	-	-	-	-	-	-	-	-
Greta Valley pipe upgrade (u/s of Greta West 3.5km 90mm PN12)	-	-	-	115.5	-	-	-	-	-	-
EQ related works – H1 intake/res, Greta Valley Res, Davaar PS	318.1	-	-	-	-	-	-	-	-	-
Hydraulic model build	30	-	-	-	-	-	-	-	-	-

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Subtotal	**876.6**	**112.5**	**37.5**	**153**	**225**	**37.5**	**37.5**	**37.5**	**37.5**	**37.5**
District Wide										
District Wide DWSNZ Full Treatment Compliance Investigation	-	-	689	1381	-	-	-	-	-	-
District Wide DWSNZ Full Treatment Compliance works	-	-	-	-	3392	4831	4100	998	1268	-
District Wide Power Upgrade	-	-	-	-	-	240	300	240	120	-
Investigation into power supplies & generators across the district	-	-	20	-	-	-	-	-	-	-
Potential Land Purchase/Lease for DWSNZ Full Treatment Works	-	-	120	100	-	-	-	-	-	-
District Wide Pump replacement	39.6	79.2	118.8	158.4	158.4	158.4	158.4	158.4	158.4	158.4
District Wide Pump Shed Upgrades	40	40	40	40	40	40	40	40	40	40
District Wide Pipe Condition Rating	25	25	25	25	25	25	25	25	25	25
District Wide Facility Criticality	36	36	36	12	12	12	-	-	-	-
District Wide Flow Meters	34	34	34	34	34	34	34	34	34	34
District Wide Pump Efficiency Assessment	15	-	-	-	-	-	-	-	-	-
Subtotal	**189.6**	**214.2**	**1082.8**	**1750.4**	**3661.4**	**5340.4**	**4657.4**	**1495.4**	**1645.4**	**257.4**
Total	**4248.9**	**1846.1**	**2778.3**	**3015.4**	**4763.9**	**6248.4**	**5162.4**	**3280.9**	**3546.9**	**3662.9**

7.5.4 Accounting for Asset Upgrade

Upgrade Definition

Upgrades comprise works on assets that improve hydraulic capacity, Levels of Service, performance, area serviced or add new features/components to the existing facilities. These may be carried out as a response to growth or increased consumer demand for improved Levels of Service. Upgrade works will be planned well in advance.

7.5.5 Upgrade Policy

Upgrades are identified in Strategic Plans, arising from decisions made by consumers who wish to increase (or decrease) the Levels of Service of their schemes. Subdivision works (eventually network equipment) rest primarily with the developer.

Upgrades can also arise from legislative requirements to mitigate impacts from activities or to comply with minimum standards. Upgrades may also be considered where assets have reached or will soon exceed their life expectancy, which is seen as an appropriate time to review capacity and is an opportunity for incorporating new technologies.

Council will instigate upgrade programmes by undertaking investigations and preparing Issues and Options reports for the consumers and scheme or ward committee members to consider and approve (or otherwise).

With consumer driven requests for upgrades there will be numerous alternatives as the status quo becomes the base from which to consider change. With improvements driven by legislation, latitude may be more restrictive as change is often less negotiable and the principal drive may be to minimise costs of compliance while meeting agreed criteria.

All development work associated with private sub-divisions or new applicants will be a cost to the developer or applicant. All plans, information and associated paperwork as part of an asset vesting to Council will be accepted on completion of works and after plumbing, drainage and other inspections have been carried out to standards or codes required by the respective regulatory agents.

7.5.6 Development contributions under the District Plan

The District Plan provides for financial contributions to be made by developers, with contributions being up to 100%, but no less than 50% of the actual cost of upgrading an existing road or building a new road, including the land.

The District Plan also provides for cost-sharing arrangements where developers are reliant on new roads or upgrades to an existing road. The maximum contribution shall be 100% of the costs of the works.

Of note, the recent amendments to the Resource Management Act 1991 (Resource Legislation Amendment Act 2017 (RLAA17)) includes an amendment to remove Financial Contributions from the RMA. This amendment will take place five years after royal ascendency of these changes. From the 18 April 2022 no new financial contribution conditions can be included in decisions. Any conditions previously required before this date would remain. The Ministry for the Environment (MFE) have recommended the following alternatives:

- Development contributions
- Developer agreements under the Local Government Act (Section 207 A-F)
- Targeted rates
- Other Alternative funding sources
- Resource consent conditions for works or offsets.

7.5.7 Deferred Upgrade Works

There are no issues anticipated with deferring upgrade work as any alteration to proposed timings will be by consultation with consumers. No specific provision has been allowed for in this initial plan for deferring project work.

7.6 Asset Disposal

The development of Asset Management Systems and use of Asset Condition/Performance data allows better planning for the disposal of assets through rationalisation of asset stock or when assets become uneconomic to own and operate.

Asset disposal is the activity of disposing of decommissioned assets whether surplus or replaced by new improved systems. Disposal activity for the water activity relates to the sale of surplus land, decommissioned pipes, mechanical and electrical equipment, and the demolition of structures.

Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Provision exceeds required Levels of Service
- Uneconomic to upgrade or operate
- Policy change
- Service provided by other means, for example private sector involvement
- Potential risk of ownership (financial, environmental, legal, social, vandalism)

In all cases asset disposal processes must comply with Council's legal obligations under the LGA 2002, which covers:

- Public notification procedures required prior to sale
- Restrictions on the minimum value recovered
- Use of revenue received from asset disposal

Under the Water Activity no assets for disposal are considered to be eligible to be for sale. When considering disposal options all relevant costs of disposal will be considered, including:

- Evaluation of options
- Consultation/advertising
- Obtaining resource consents
- Professional service, including engineering, planning and legal survey
- Demolition/making safe
- Site clearing, decontamination, and beautification

All pipe renewals identified in Section 7.3 have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the Water Services are renewed using 'no-dig' techniques or the asset is replaced in a new location. A work order report records each disposal and the details are put in the AssetFinda database. Similarly, replacement of components at treatment plans and pumping stations usually involves disposal of those items being renewed/upgraded. Generally, buried assets remain in the ground unless economic to remove or they pose a potential hazard. In all cases asset disposal processes must comply with Council's obligations which include public notification procedures prior to sale, and use of revenue received from asset disposal.

At the time of writing this plan no assets have been identified for disposal or abandonment.

7.7 Asset Performance, Condition and Lifecycles

7.7.1 Performance

Performance for utilities assets are assessed against two criteria.

a) Original design criteria - used where this information has been retained on network files or is clearly known by the operators and may include a reassessment to account for improvements and changes arising from refurbishment and upgrading of assets. This is a quantitative calculation of performance.
b) Service Levels - used where the quality of service to consumers is influenced or limited by asset performance. This is a qualitative assessment and may influence the nature and timing of upgrade or renewal works.

Records held on Council files on the performance of assets provide a broad course measure on which to create a performance history.

Condition scoring for above ground assets (including plant/electrical) is less intrusive, and provides a greater level of reporting confidence. All asset component levels can be evaluated separately. However, not all assets have been evaluated as at June 2008, hence default values continue to be applied in such instances. The original plan did not apply default scores. In this way, the plan focussed only on those areas or assets that were of concern (known weaknesses). This concept applies still for default values.

7.8 Asset Inventory

7.8.1 Sourcing Data for Asset Inventories

The asset register (started June 1999) originates from as built or tender/construction plans, design plans, MapInfo information, GPS readings, site visits and measurements, suppliers information, discussions with water/wastewater operators, plus field notes and file records. As data is collated, it is entered into MapInfo as the primary recording source. Data held on files covers capacities, length, numbers of units, materials, location and placement, age of assets, types of fittings, sizes, diameters, pressure classes and operational parameters.

7.8.2 Confidence Levels for Asset Register

The confidence for the accuracy and completeness of assets shown in the register has been based largely on judgement as to the reliability of various sources of information. GPS, survey, as-built records and on-site measurements provide a higher confidence level (nominally 5%) as compared to assessments based on design plans, map referencing and word of mouth (up to 20%).

As data is loaded into MapInfo and locations are refined through more reliable data collection (survey, GPS), confidence levels for numbers, sizes, classes and lengths of asset components will improve. Ideally, a maximum of 5% margin of variation should be achieved over time for all but minor supply lines on rural schemes. For older reticulation assets a confidence level between 7-10% is considered a more realistic level. Confidence levels have not been revised since the assessment in 2008 and these are shown in Table 7-13 below for water assets.

Table 7-13: Water Asset Data Confidence Levels

Item	Initial Confidence as at June 1999 (+/-%)	Revised Confidence as at 30 June 2008
Pipe lengths/types/sizes	7.5%	7.5%
Pumping Station data	7.5%	5%
Power Supply sizes/location	7.5%	5%
Electrical Control equipment	10%	10%
Disposal plant items	7.5%	5%
Miscellaneous items	10%	10%

Replacement Costings	10%	5% (materials) 10% (installation)

7.9 Asset Valuation

Valuation of Council utility asset components continues to be based on linear depreciation from present day replacement values to zero residual value for the spent proportion of the anticipated lifecycle for the component. This only applies to Council network assets, up to but not including consumer equipment (tanks/private pipe-work excluded). This can be either on a standard lifecycle period or a modified (one-off or discretionary) entry.

Optimised depreciation (ODRC) methods have been considered, but as depreciation is not being collected for assets and with asset component recording being to a detailed level, this is not justified. There is little obsolescence within the components scheduled and no surplus assets or asset capacity to take into account, thus over-design has not been introduced in the past, if fact all lines are very close to optimum capacity. Degree of optimisation is limited to 'reproduction of existing assets' and timing renewal to avoid impacts from obsolescence.

Straight line depreciation may not accurately reflect the rate of decline in service potential for all assets, as not all components decline in performance at a constant rate. For some items, performance or condition may be such that the net value of the components will remain closer to the original replacement value over most of its life and then degrade rapidly towards total failure near full life term. However, wear and tear will impact on all components so "real" value during operating life-cycle will always be less than its replacement cost (other than land) and so linear depreciation fits well with this concept.

It is not proposed to further investigate specific decline curves (pipes, structures, pumps, reservoirs, fittings, valves, electrical) or the materials or components of which they are made. As greater confidence is attained for specific decline curves within the utility industry (nationally and internationally), new values may be considered for asset valuations, but only where a benefit can be had from doing so. GST and land values are not included in any valuations.

In the valuations, assets are grouped into line, point and plant. Line assets relate to pipes, points to assets such as manholes and plant assets cover facilities data such pumps, electrical equipment and SCADA units.

The following two graphs and table detail the extent of the water schemes valuation as at June 2017.

Figure 7-11: Water Replacement Costs (June 2017)

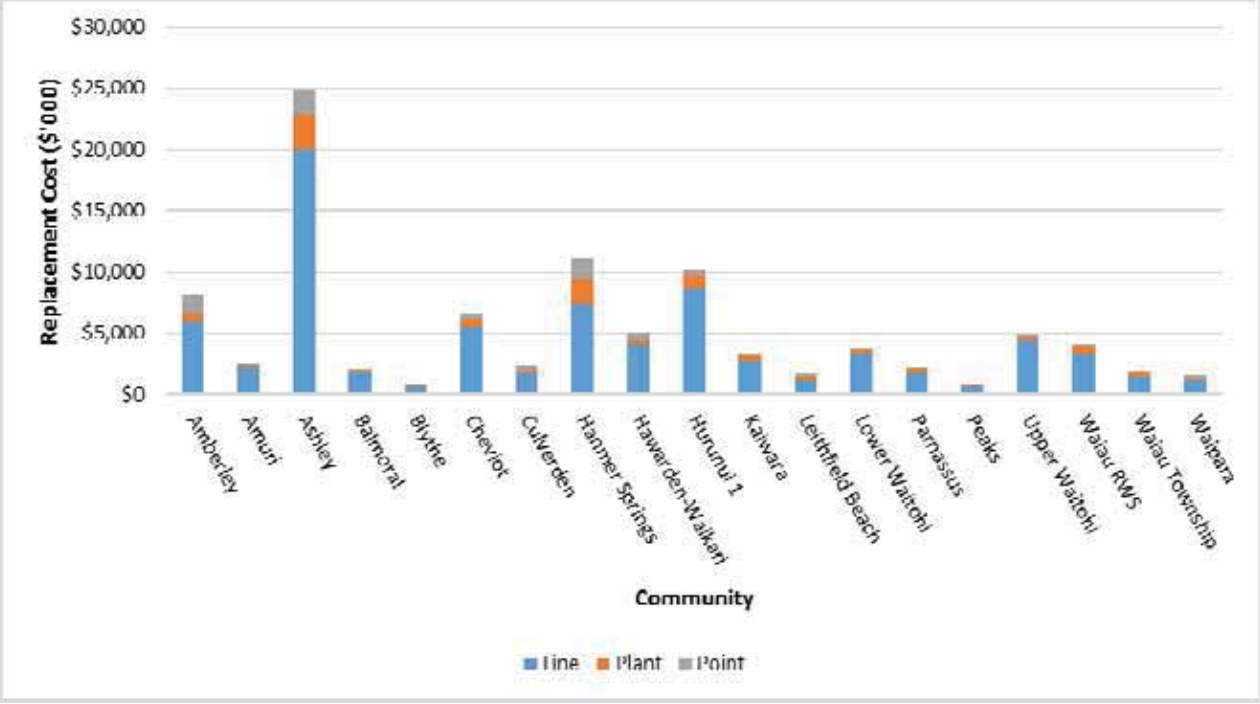
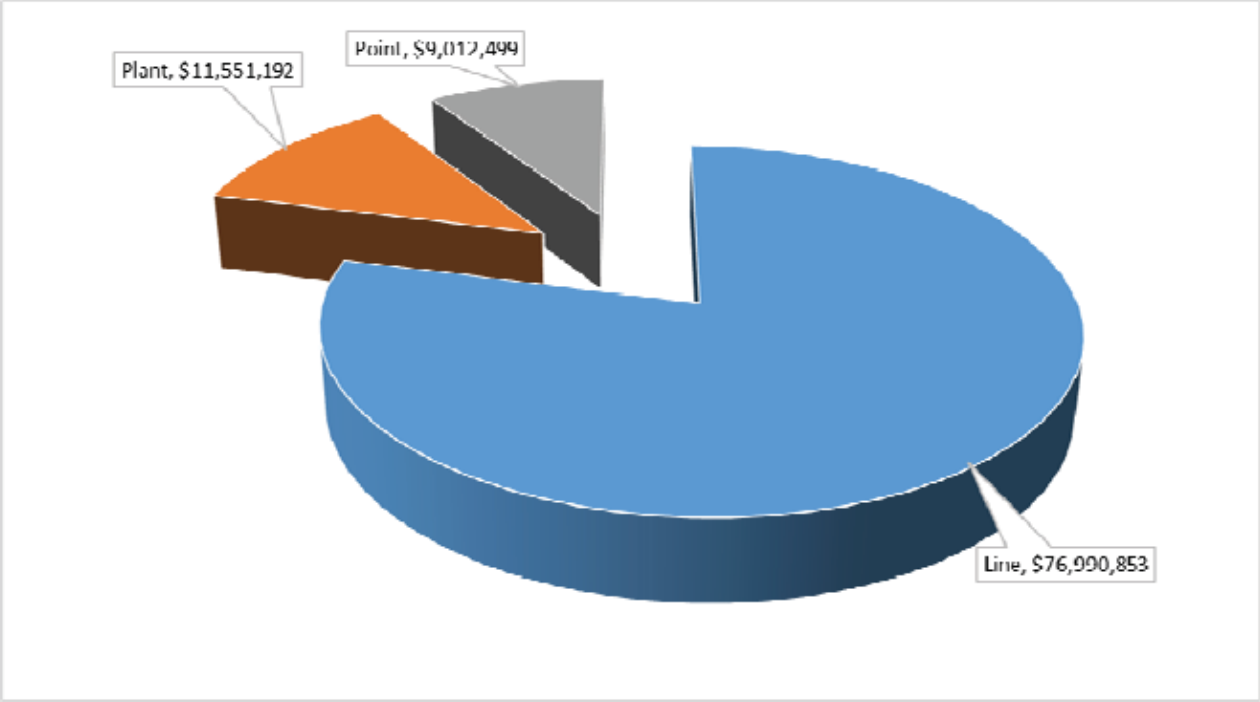


Figure 7-12: Water Replacement Costs by Asset Group



Source: 2017 Valuation

The June 2017 summary of asset values and replacement costs is tabled below:

Table 7-14: Water Asset Valuation (June 2017, $,000s)

Community	Total Replacement Cost	Depreciation Replacement Value	Annual Depreciation
On Demand Schemes			
Amberley	**$8,132**	**$4,360**	**$121**
Line	$5,858	$3,244	$72
Plant	$645	$249	$19
Point	$1,629	$867	$30
Culverden	**$2,297**	**$471**	**$16**
Line	$1,677	$227	$4
Plant	$287	$128	$5
Point	$333	$117	$7
Leithfield Beach	**$1,655**	**$1,059**	**$26**
Line	$1,091	$746	$14
Plant	$312	$205	$9
Point	$252	$107	$4
Hanmer Springs	**$11,142**	**$6,303**	**$177**
Line	$7,365	$4,433	$98
Plant	$2,020	$1,011	$32
Point	$1,757	$859	$48
Hawarden-Waikari	**$5,051**	**$1,474**	**$83**
Line	$4,054	$1,304	$62
Plant	$338	$51	$4
Point	$658	$120	$17
Waiau Township	**$1,872**	**$832**	**$31**
Line	$1,365	$567	$20
Plant	$262	$163	$6
Point	$245	$103	$5
Waipara	**$1,538**	**$425**	**$30**
Line	$1,128	$256	$19
Plant	$182	$108	$6
Point	$228	$61	$6
Restricted Schemes			
Amuri Plains	**$2,572**	**$1,453**	**$36**
Line	$2,239	$1,317	$28
Plant	$176	$55	$4
Point	$157	$81	$4
Ashley	**$24,892**	**$16,575**	**$382**
Line	$20,100	$13,827	$259
Plant	$2,713	$1,315	$69
Point	$2,079	$1,433	$54

Community	Total Replacement Cost	Depreciation Replacement Value	Annual Depreciation
Balmoral	**$1,966**	**$1,142**	**$28**
Line	$1,676	$979	$21
Plant	$232	$137	$6
Point	$58	$27	$1
Blythe	**$845**	**$434**	**$13**
Line	$624	$344	$8
Plant	$196	$79	$4
Point	$26	$12	$1
Cheviot	**$6,564**	**$2,769**	**$103**
Line	$5,429	$2,479	$77
Plant	$588	$119	$12
Point	$547	$171	$14
Hurunui 1	**$10,152**	**$4,419**	**$135**
Line	$8,572	$3,961	$103
Plant	$1,123	$239	$22
Point	$457	$218	$10
Kaiwara	**$3,254**	**$1,780**	**$50**
Line	$2,649	$1,546	$36
Plant	$514	$193	$12
Point	$91	$42	$2
Lower Waitohi	**$3,732**	**$1,992**	**$51**
Line	$3,182	$1,832	$40
Plant	$438	$99	$9
Point	$112	$61	$2
Parnassus	**$2,137**	**$1,141**	**$33**
Line	$1,765	$1,036	$24
Plant	$300	$72	$8
Point	$72	$33	$2
Peaks	**$793**	**$461**	**$11**
Line	$630	$398	$7
Plant	$135	$50	$3
Point	$28	$13	$1
Upper Waitohi	**$4,868**	**$1,852**	**$62**
Line	$4,360	$1,710	$54
Plant	$340	$70	$4
Point	$168	$71	$4
Waiau RWS	**$4,093**	**$1,924**	**$60**
Line	$3,227	$1,705	$44
Plant	$750	$162	$14
Point	$117	$57	$2
Total	**$97,555**	**$50,867**	**$1,448**

Lines – all types of mains, Points – hydrants, valves, PRV etc. Plant – Pumps, buildings, facilities etc.

7.10 Information Sourcing for Decision Making

7.10.1 Limitation in Assessing Data

Council's water operators have held positions for between 5 to 20 years and have considerable collective experience in operating facilities and identifying, condition and performance issues in the 19 separate water schemes within the District. They are also well placed to identify trouble areas or high demand sections that require more maintenance or could benefit from renewal.

The key in maintaining effectiveness of the asset register is to note all repairs or minor renewals on reticulation and update plant/mechanical, reservoirs, intakes and other key item files as assets are upgraded, replaced, repaired and to document the person who has carried out the update and the date. The purpose is to maintain an up to date register and to avoid reliance on manual recording and staff recall (both hard to retrieve data and obtain consistency).

7.10.2 Information Sources

Table 7-15 presents the origins or activities for information sourcing and the expenditure categories that these apply to plus the approximate frequency that data is likely to be sourced from each type of activity.

Table 7-15: Information Sources

Source of Information	Maintenance	Renewal	Upgrade	Frequency
Water operator comments and field notes	✓	✓		Ongoing
Water operator meetings	✓	✓		6-12 weeks
Professional utilities staff meetings	✓	✓	✓	2-4 weeks
Formal customer fault/complaint recordings	✓			Ongoing
Other direct feedback by public/consumers	✓	✓		Ongoing
Water scheme committee meetings	✓	✓	✓	3-9 months
RMA/consent monitoring and applications			✓	1-35 years
Changes to non-RMA/consent legislation		✓	✓	Unknown
Utilities staff field investigations/inspections	✓	✓	✓	Ongoing
Emergencies impacting on schemes (floods)	✓	✓		Unknown
Council works/services committee meetings	✓	✓	✓	6 weeks
Formal plan requirements (district/regional)	✓		✓	1-20 years
Re-evaluation of components at end of life		✓		Ongoing
Growth in Levels of Service from consumers			✓	Ongoing
Growth in demand from numbers			✓	Ongoing
Input by consultants or contractors		✓	✓	Ongoing
New technologies or post upgrade experience	✓		✓	Ongoing

8.0 FINANCIAL SUMMARY

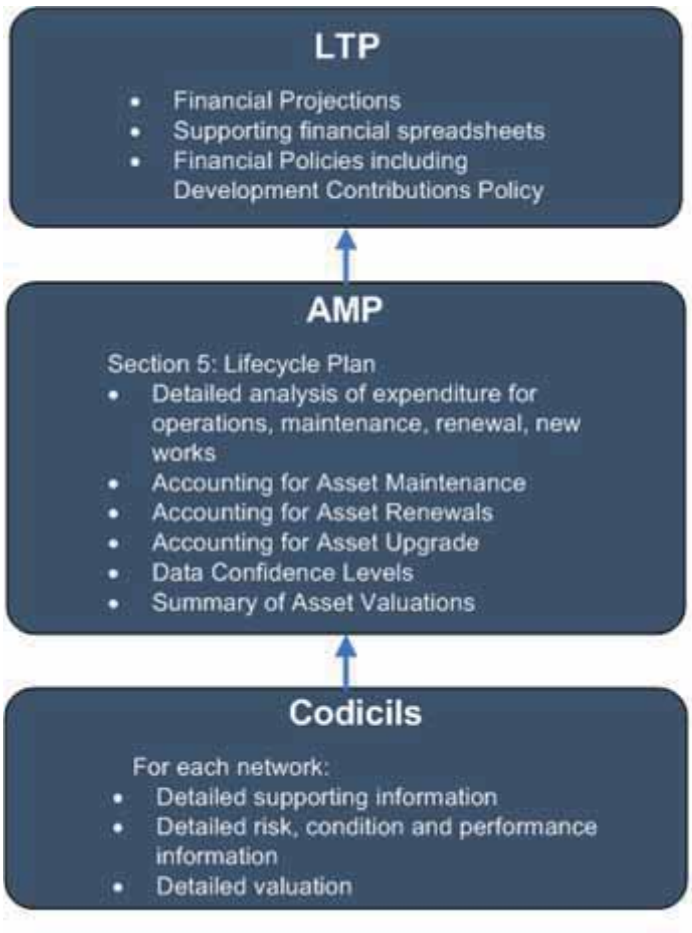
This section sets out financial statements, funding strategy, depreciation forecast and charges for the Water Service

8.1 Introduction

As outlined in Figure 2-1 this AMP is part of an integrated document set that includes the LTP, this AMP and the Codicils.

The details of the integration and presentation of financial information is shown Figure 8-1 below:

Figure 8-1: Arrangement of Financial Information in Management Documents



As shown in Figure 8-1 above and resulting from this integration the Council has chosen to include all asset related financial statements and projections in the LTP financials and supporting spreadsheets.

Financial Policies, including the Development Contributions Policy, are included in the LTP, and again, are not replicated in this AMP.

8.2 Financial Statements and Projections

Historically, all schemes have been managed using a financial statement of revenue and expenditure. These have been in place for each scheme since amalgamation of authorities in 1989, with most dating back to scheme inception. Budget projections have been set ten years ahead of the current

financial year and are categorised as revenue, operating expenditure and capital expenditure (with no depreciation of assets). These projections are contained in the LTP and supporting spreadsheets.

Council's Funding of Depreciation Policy is set out in the LTP. In 2015, after district-wide consultation, Council put in place a depreciation funding policy for water and wastewater. The Council proposed to rate for the depreciation of water and wastewater assets and that funds generated by these rates would be used to reduce the overall debt related to previous water and wastewater asset replacements and would thus give Council the ability to replace assets when they need to be replaced. By funding depreciation, the cost of replacing an asset is met by those who benefit from using that asset.

This rating proposal was also to change from a targeted rating model to a district-wide rating system for all properties that are served by our water and/or sewerage schemes. Council believes that water and sewerage are general services and should be affordable for all of our communities in our district.

This proposal enables the affordability of costly capital works across all of our communities rather than individual communities having to bear costly rate increases to meet regulatory standards. One exception was made to Council's proposal, and that was for those connected to the Balmoral Rural water supply. The impact of the proposal would have resulted in a sudden hike in rates for those water consumers. A compromised position to stage in the rate increase was proposed instead to help make the change more immediately affordable to consumers of the Balmoral Rural scheme.

Under this system, routine maintenance and programmed asset replacements will continue. The funding of renewals will take place from the year that it is planned for the renewal to take place, not when it actually takes place, unless the renewal is before the planned year. Funding is currently rated for through the debt structure.

Having consumers represented at the local level in Water Advisory Groups (WAG) is considered to be one of the main strengths of the current organisation and there is no intention to diminish the impact and contribution of these committees. Each WAG has a representative to the Water Liaison Committee (WLC) where future strategic forward planning considerations are discussed and recommended forward to the Infrastructure Committee for endorsement and subsequent recommendation to Council Committee for approval.

8.3 Funding Strategy

Core Principles

In reviewing the Long Term Plan (LTP), Council has revised their core principles and these have been used as the basis in developing the district's Financial Strategy. These principles are:

i). Focus on core services
ii). Financial responsibility and affordability
iii). Continuous improvement in service for everyone in our district
iv). Facilitate appropriate growth in the district

Within the context of Council's four core principals, Council has identified the following key factors that shape HDC's Financial Strategy over the life of this LTP:

a) We want to ensure that our services remain affordable
b) We want to maintain or improve our current levels of service

Our key funding mechanisms are:

1. Rates, both District Wide and Targeted rates
2. The appropriate use of the profits derived by the Hanmer Springs Thermal Pools and Spa
3. Funding Depreciation on Utilities (Water, Sewer and Stormwater)

4. The use of the Internal Financing structure which provides internal loans for communities requiring funding to carry out Capital Projects.

Rates, increases and limits
Council has set a policy in the 2015 LTP of rate increases (after allowing for an assumed amount of growth) will not exceed 6% for the first five years of the plan and then not exceed 3% for the following five years of the plan.

External debt and limits

The Local Government Act also requires us to set a limit on our external debt levels. These debt levels are set out in our External Liability Management Policy, which forms part of our Treasury Risk Management Policy. The limits are based on ratios centred on the level of income and are still lower than what is considered standard for the local government sector.

The Policy allows for four key ratios that the Council needs to meet:

- Total Debt is no more than 100% of Total Income (excluding Development Contributions and Vested Assets Income)
- Total External Interest Cost is no more than 6.25% of Total Income (excluding Development Contributions and Vested Assets Income) Total External Interest Cost is no more than 12.5% of Total Rates

Based on the budget information for the LTP, the Council will not exceed any of these limits over the period of the LTP.

Council's Revenue and Financing Policy is set out in the LTP. The underlying funding strategy requires collecting sufficient revenue to maintain the expected Level of Service on a scheme by scheme basis.

Total revenue arises from:

- Rates
- Fees and charges – including fines/penalties
- Interest
- Central government grants and subsidies (where available)

Revenue requirement is under-pinned by these expenditures, defined as follows:

- Maintenance: The cost of servicing and materials required to maintain all existing assets at the current Level of Service. Maintenance costs for scheme are reasonably predictable and have only changed when new water treatment or monitoring processes have been added.
- Capital Expenditure: The cost of new assets, adding to the total asset value and raising or extending the Level of Service.
- Renewal: The cost of replacement of an asset at the end of its economic life.

8.4 Valuation Forecasts

Infrastructural assets have been valued at depreciated replacement cost as at 30 June 2017. A summary of the valuations is presented in Table 7-14.

8.5 Key Financial Forecasts Assumptions

- In relation to the standard (FRS29), the financial information for this period is considered to be a "forecast". The actual results achieved for this period are likely to vary from the information presented and may vary materially depending upon the circumstances that arise during the period

- Water reticulation and treatment assets will remain in Council ownership throughout the planning period and Council will continue to provide services to approximately the same standards as at present
- The present management approach will maintain schemes at the current Levels of Service (at least) over the next 10 years
- Renewal costs are based on the plans outlined in Section 7.0
- Capital works are funded by loans per the Council's Revenue and Financing Policy
- Growth assumptions factored into the AMP are as outlined in Section 5.0
- No significant disposal is forecast over the 10-year period
- Asset values and lives have been taken from the June 30 2017 valuation
- Useful lives have been ascribed to the assets and provide information to support replacement plans
- The costs of insurance and risk mitigation are included in the forecasts, however the potential costs that could arise through exposure to risk are not
- Asset information will continue to be acquired to obtain a full understanding of the community reticulation networks condition over all the schemes
- The external regulatory environment could change significantly over the next three years, dependent upon the outcomes of the Havelock North inquiry and possible subsequent legislative changes for improved management of drinking water across the country
- Asset improvements aimed at producing, more stable and compliant potable water schemes will be delivered to meet national standards subject to criticality, performance and affordability
- The population model is based on a number of assumptions including economic growth and levels of migration and therefore subject to some uncertainty
- Council's planning and budgets, statements of Levels of Service and the Water AMP are all predicated on the basis that Council will achieve compliance with DWSNZ
- Resource consents held by the Council will not be changed significantly for water supply
- The Council will obtain the necessary resource consents for planned projects
- Existing legislation will remain in place and that the structure and responsibilities of the Council will remain the same over the period covered by the LTP.
- Climate change is happening but that there will be no significant impact on the Council's activities within the period covered by the LTP
- A long term renewal programme across the range of reticulation and facility assets has been developed and is based on a number of assumptions on age, predicted asset life, material type and assumed prevailing condition
- All costs and financial projections in this AMP are GST exclusive
- That the damage caused by the Kaikoura 2016 earthquake has been addressed under the earthquake recovery programme and that there is no material reduction of the effective remaining useful life of assets generally in the district

8.6 Funding Policy for Assets

8.6.1 Funding Mechanisms

At the end of June 2017 Council had borrowed $24 million. Council's policy means that the maximum HDC can borrow is no more than the income HDC earns. The projected total for the district in 2017-18 (this year) is $42 million, which means the most Council can borrow is $42 million. Given the amount That Council needs to spend, Council had no option but to look at alternative ways to pay for the costly service upgrades identified in HDC's 30 Year Infrastructure Strategy (included within this document). Costs have been driven up through increased central government regulatory standards. To fund these infrastructure and regulatory upgrades, and manage the associated debt in a sustainable manner, Council made some fundamental changes to the way we historically did this, notably:

- Council has progressively introduced rating for depreciation to accumulate funds to assist paying for the water and sewer infrastructure upgrades. This change was introduced to reduce the need to increase our debt by totally relying on borrowing to fund the upgrades. Council cannot continue to borrow the full amounts as the cost of the capital projects will push our debt levels beyond our debt ceiling, and exceed our ability to repay the debt.
- Council continues to use a district-wide rating system to fund our water and sewer services instead of the historic localised targeted rating. It should be noted that this only applies to those on Council run schemes.

These changes were a significant departure from the way in which we had been managing debt and funding water and sewer. These changes have resulted in sustainable policies to take Council into the foreseeable future. Although the changes have increases rates from our historically low levels, the Council is still confident that the Hurunui district remains an affordable place to live.

8.6.2 Maintenance

Maintenance is funded from cash reserves held from collected user charge monies within each network account.

8.6.3 Renewals

Reactionary work (flood/landslide damage or immediate failure) will first use up any excess funds in the account or require overdraft or insurance/disaster relief monies. These (where necessary) will be repaid over an acceptable period of time (to both users and managers) to minimise increase in rates.

8.6.4 Upgrades

These projects are planned well in advance and can be incorporated into budgets ahead of works, with all parties aware of the costs involved with the project. Repayments are spread over 1 - 20 years. In some instances, upgrade costs are quite small and may be repaid by network cash reserves within the year they have been incurred. Larger upgrades will rely largely on borrowed money. Spreading of repayments is discretionary and agreed by consultation with the scheme Community.

8.6.5 Other work

All external upgrade work associated with sub-division or new consumers is met by the developer or applicant. Where infrastructural improvements are required on existing assets to accommodate new consumers, they are met through connection fees (capital contributions in urban schemes) or if costs are in excess of these, through scheme funds.

Further detail of these mechanisms is contained in the LTP.

9.0 ASSET MANAGEMENT PRACTICES

This section outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the AMP.

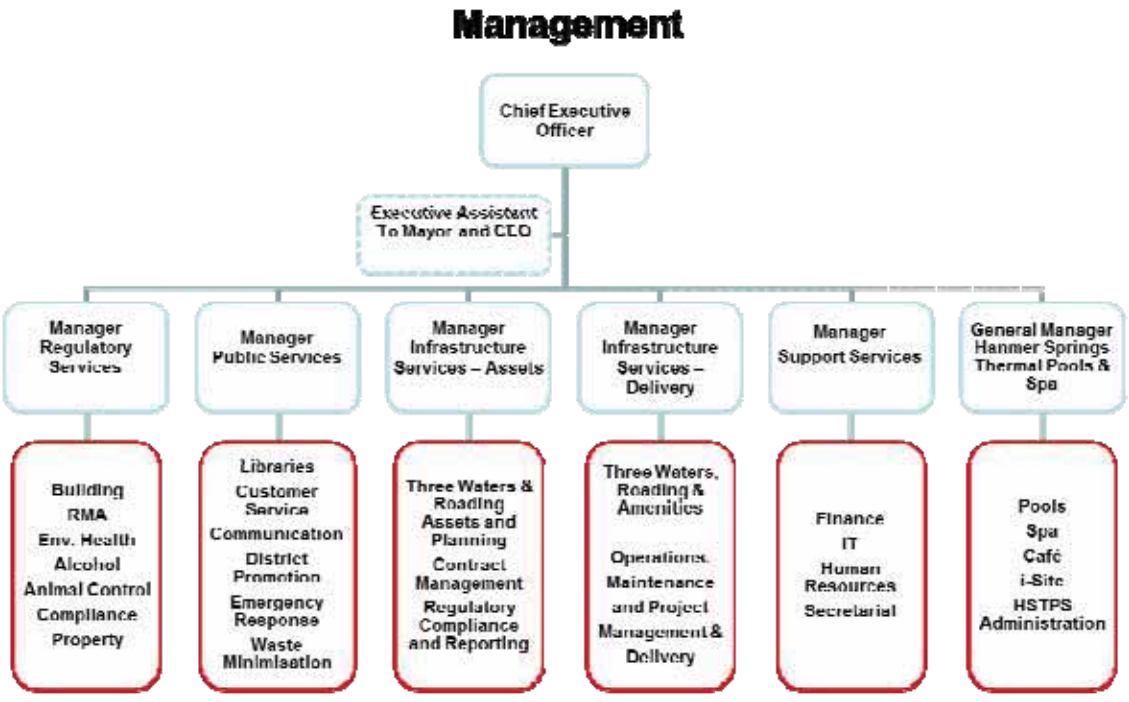
9.1 Responsibilities for Asset Management Outcomes

Responsibility for the asset management function is allocated to the Manager Roading and Utilities. This Manager is responsible for the Land Transport, Water, Wastewater and Stormwater schemes. This responsibility includes:

- Ensuring constructed, maintained and in compliance with consents
- Adequate budgeting and long-term forecasting
- Monitoring Levels of Service for services provided by assets
- Identifying and managing asset and service related risk
- Reporting of Level of Service, key performance indicators and risks at corporate level
- The achievement of Asset Management practices which meet corporate Asset Management development standards and reporting of these in the AMPs

The following organisational structure outlines responsibility and linkages between Group Managers.

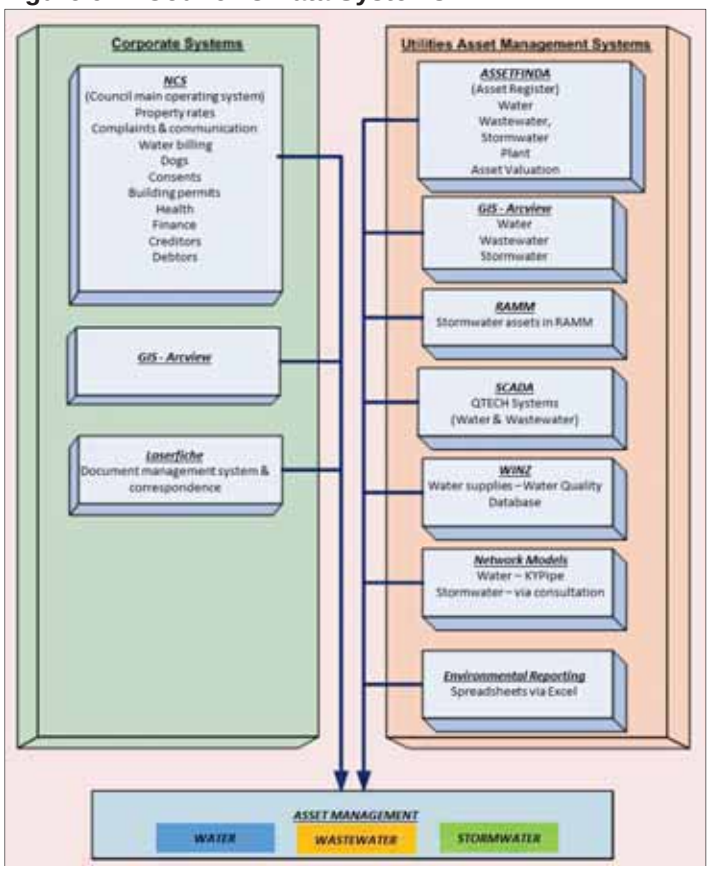
Figure 9-1: Council Staff Structure



9.2 Business Processes

Figure 9-2 below details the data systems that are presently used within Council and their relationship with other systems.

Figure 9-2: Council's Data Systems



9.3 Accounting / Financial Systems

The Council uses the Napier Computer Systems (NCS) software for its accounting and billing systems. This does not store or compute asset management information, but is now used to determine the number of properties billed for rates for checks against connections to the infrastructure shown in GIS. Some differences have been found between connections shown on ArcGIS/AssetFinda and NCS. However all formal asset management financial reporting including valuation is handled by the AssetFinda system. Therefore there are no reconciliation issues since no separate accounting asset register is used for the assets.

Each of the schemes has its own cost centre in Council's accounts. The income from charges and the costs of maintenance, operation and capital improvements are accrued to the scheme to which they apply. The charges are a global district-wide targeted rate, with the exception of the Balmoral scheme that continues to have a specific rate for the connected users. This provides Council officers the opportunity of prioritisation of works by criticality and not just affordability.

LTP forward projection models are completed using spreadsheets and forwarded to the Manager Support Services for the development of the 10 year financial strategy. This ultimately results in curtailed projected works to match the affordability of the District. Financial services have an officer designated to asset management reconciliation (accrued capital works), however, the limited Council resources (both in infrastructure and finance teams) means that the reconciliation only occurs once per year. Monthly and/or automated reconciliation is identified as an improvement area.

9.4 Asset Management Systems

The AssetFinda Asset Management system was purchased and implemented by Council in 2006. Prior to this Council had used the following to record their asset information:

- Access database and spreadsheets - pre 1998
- MapInfo/Tables/Reports - 1998 to 2006

AssetFinda was selected for the following reasons:

- Ease of use
- Simple functionality
- Low initial fee structure
- Low on-going fee structure
- System most used by small New Zealand authorities, leading to good relevant peer support in system use

AssetFinda is used to manage and produce asset inventory reports. It is integrated with the MapInfo data tables to permit input, querying, reporting and financial modelling using the asset register data. Reports available include current replacement or depreciated value and depreciation. Reports can be produced for high level asset groups ("lines, points and plant"), and for each individual scheme. Asset Group data can be filtered from the standard report by output to and manipulation in a spreadsheet.

AssetFinda also has the capability to predict future budgetary requirements taking account of the predicted life of assets. This model been used to assist in the 30 year infrastructure model in this AMP.

9.5 ArcGIS

ArcGIS (formerly ARC/INFO) is a full-featured geographic information system produced by Esri. Historically Council's geographic information system was MapInfo but a Canterbury region initiative resulted in a number of local authorities (including Council) changing to ArcGIS.

Asset Data
The majority of asset quantity, location and pipe size data are held in the MapInfo/AssetFinda system. There are a number of quality assurance processes are used to ensure the reliability of the data recorded. These processes are presented in Table 9-1:

Table 9-1: GIS Data

Item	Details
Sampling of assets contained in the GIS / AMS	Using field tests to check the reliability of pipe capture, pipe quantities and pipe size within the GIS/AMS
Coverage testing	Checks by Asset Managers that assets captured in particular areas reconcile with the services known to be provided
Continuity checks	These are carried out in GIS to identify breaks in the piping networks and gaps in the data
Historical and new data	GIS capture of historical data has been derived from professional engineering and survey plans, from Council record sheets or Council staff knowledge. The on-going capture of asset data is derived from engineering as-built plans or from GPS surveys performed by council staff. All As-Built plans received by Council are required to comply with strict specifications and all data entered into the GIS/AMS is the subject of quality assurance processes

It is proposed as part of future improvements in the management programme section of this AMP, to develop and implement formal quality assurance systems for existing and new GIS and asset data.

9.6 SCADA

9.6.1 Background

Council has operated a Datran Telemetry or SCADA (Supervisory Control and Data Acquisition) system since about 1988 with a replacement value of $508,000. The system is used to monitor and control critical aspects of treatment plants and pump stations. 121 sites are presently monitored that include:

- 7 Wastewater treatment plants
- 4 Wastewater pump station
- 110 Water pump stations and reservoirs

The SCADA system is used for:

- Monitoring the operation of sites
- Reporting, trending and analysing historical data
- Alarm monitoring (operators are informed of alarms via text messages to mobile phones)
- Some control functions

Monitoring of Water schemes and Wastewater networks the Council's SCADA system on a real time basis has grown to the point that without the current SCADA system, maintaining the existing Levels of Service would be difficult. SCADA has given the ability for Council to ascertain faults and instigate repairs without affecting the service to the consumer has significantly increased efficiency and reliability of the water and wastewater schemes.

The SCADA system is a critical system in Council's operation and service delivery.

9.6.2 Future Strategy for Council's SCADA

Council's strategy for the ongoing use of SCADA is:

- Maintain SCADA system at a high level to ensure system reliability and ongoing reporting ability
- Increase availability of information to Council management and operational staff in a format that will enable increased efficiencies in operation and management of the utilities
- Develop the reporting functions of the system
- Develop further use of the system to control plants
- Implementing new systems and technologies where increase in LoS, efficiencies and risk reduction can be achieved

9.7 Changes in Technology

New technologies have been and are regularly introduced for both water and sewage facilities in the District, as a result of specific decisions by Council and consumers, ongoing replacement of or as a result of product obsolescence. New technologies introduced include:

- PVC / PE polymers replacing AC pipes (AC no longer made)
- Use of telemetry to link alarms at distant sites to Council offices or network operations
- Use of PLCs to maximise reliability of pumping stations
- Data capture from telemetric signal links and use of these for reporting/decision making
- Use of more efficient pumps at times of pump replacement
- Use of AssetFinda to record assets and operational data
- Fitting water meters to on demand urban premises
- Cellphone, GPS and data-logger devices for water officers to use in the field

- Membrane Ultrafiltration treatment at Waiau Township.
- Pressure loggers to determine the pressure zones within schemes.
- Introduction of Water Outlook as a tool for combining and analysing various Council and other agency datasets (SCADA/Assetfinda/WINZ data/ECan river flow data/NIWA climate data/HDC field measurement data/Sample lab results)

In 2017 Council purchased and has begun implementing Water Outlook which is a program that enables the user to combine numerous datasets from different sources (including external organisations) to allow easy analysis of data against resource consents or legislation such as Drinking Water Standards and Water Metering Standards. It also allows better and more efficient reporting to Council and other bodies than has been possible up to now and tracks on exception any non-compliance events.

Water Outlook is currently managed under Infrastructure – Service Delivery but could be utilised by other staff within the organisation.

Council has an open policy towards new technologies and will evaluate the benefits of these at the time of any upgrade or extensions to a network. These may be introduced by staff, consultants or at the request of consumers. The aim in introducing new technologies is to enhance Levels of Service and refine operation.

9.8 Existing Processes for Recording Data and Information

9.8.1 Existing Decision Making Process for Asset Works

The structured decision making processes that presently exist for utility assets are:

Minor Repairs and Replacements
Minor repairs and replacements have a structure in place that ensures action is quick to restore the service and monies required are drawn from funds held for each scheme. Provided that monies have been allocated in the annual budget no specific approval is required for expenditure to a level of:

- $20,000 for the Utilities Engineer
- $50,000 for the Engineering Manager
- $100,000 for the Chief Executive
- $1,000,000 for jointly Chief Executive/Mayor
- >$1,000,000 for Council Committee

Specific excursions or expenses are brought before Council for discussion and approval.

Major Unforeseen / Unplanned Replacement or Renewal Works
Typically urgent and necessary works are promptly actioned by utilities staff or where necessary, with assistance from consultants and are not always put out to open tender, due to the urgent nature of the work. Monies are often drawn from Council reserves and paid back by a minor rate increase for up to a 20 year period.

Larger Works, Acquisitions or Major Planned Maintenance/Renewal Works
Larger works are considered as part of a consultative process with consumers, committees and are considered for approval by Council, using cost estimates and supporting information prepared for each. Outcomes are refined by consultation, design and evaluation by utilities staff, input by consultants (where used) and through peer review of the final outcome. Costs estimates are refined through the tender process.

Risk Assessment
The decision making process presently used for planning renewals or upgrading accounts for obvious risk (flood, sewage overflows, ground stability, water availability and information about water quality). An example of how risk has been assessed in planning new works can be seen in the 1999/2000 investigations for the Hanmer Springs water upgrade. This looks at:

- Other options for reliability of supply
- Risk of supply continuity/failure of supply from the source
- Risk of public health risk from catchment contaminants
- Risk of under-resourcing upgrade
- Risk of cost overruns
- Ability and costs of tracking water in future
- Seismic, flood or land movement on the work site

Contract and Purchasing Procedures

Contracts and Purchases for materials and services are treated alike within Council's current procurement policy as:

- Up to $1,000 Purchase from preferred contractor or Supplier
- $1,000 - $5,000 Quotes to be obtained from two preferred Contractors or Suppliers
- $5,001 - $10,000 Quotes to be obtained from three preferred Contractors or Suppliers
- $10,001 - $20,000 Selective tenders obtained in writing from at least three preferred Suppliers or Contractors
- $20,000 or more Open tender

Selection of materials or services is typically on cost up to $20,000. Above this tenders are selected on a weighted basis or lowest price conformity. For contracts and consultants, this has traditionally been based on the NZTA model.

Performance Criteria
Where work is planned, evaluations for additional capacity or performance levels is considered as part of the investigation effort. Through further evaluation or consultation, a decision on implementing enhanced capacity or Levels of Service is then made. Performance criteria using maintenance events logged in AssetFinda is beginning to be used for prioritising pipe renewals from 2017 onwards.

New Technologies
No formal procedure exists to ensure that new technologies are considered as part of any planned maintenance/renewal works for assets but this one typically carried out with new works or acquisitions through issues and options investigations and consultation.

9.8.2 Adequacy of Current Systems for Asset Management

Data collected (at June 2017) is maintained at an advanced inventory level. Items are broken into discrete components and hold age, type, size, cost, lifecycle, condition, risk and performance entries (along with other detailed entries). Comments can be added on all components.

The data is held in ArcGIS / AssetFinda as 'instant in time' entries, but can be given real time status by recording comments or maintenance entries against each item or location. As maintenance is added to assets AssetFinda automatically updates the condition of the asset. All records are updated first on ArcGIS / AssetFinda, being the principal database.

The current system is adequate for Council's Asset Management requirements.

9.8.3 Minor Future Improvements Identified for Data Collection

As a component of the analysis in preparing this AMP, Council have identified some minor improvement items that have been identified below:

- Update asset maintenance records from back log (over last 12 months)
- Update plant asset data (water & wastewater) to ensure that the correct data is present.
- Determine a consistent plant hierarchy at each facility.
- Review AssetFinda asset replacement rates
- Over next three years re-establish annual replacement costs and annual averages
- Update AssetFinda asset lives and remaining useful life calculations
- Use of iPads by utility officers to allow direct update of maintenance tasks to AssetFinda which will improve the flow of data from the field.

9.9 Asset Inventory

9.9.1 Sourcing Data for Asset Inventories

The asset register (started June 1999) originates from as built or tender/construction plans, design plans, ArcGIS information, GPS readings, site visits and measurements, suppliers information, discussions with engineers and contractors, and file records. As data is collated, it is entered into AssetFinda as the primary recording source. Data held on file covers length, material, location and placement, age of assets, sizes and diameters.

9.9.2 Confidence Levels for Asset Register

The confidence for the accuracy and completeness of assets shown in the register has been based largely on judgement as to the reliability of various sources of information. GPS, survey, as-built records and on-site measurements provide a higher confidence level (nominally 5%) as compared to assessments based on design plans, map referencing and word of mouth (up to 20%).

As data is loaded into AssetFinda and locations are refined through more reliable data collection (survey, GPS), confidence levels for numbers, sizes, classes and lengths of asset components will improve. Ideally, a maximum of 5% margin of variation should be achieved over time. For older reticulation assets a confidence level between 7-10% is considered a more realistic level. Confidence levels are shown in Table 9-2 below for asset data.

Table 9-2: All Asset Data Confidence Levels

Item	Initial Confidence
Pipe lengths/types/sizes	25%
Manholes	15%
Replacement Costings	10%

Further work is required to make the age, condition & performance of the asset components more accurate. Asset age was analysed during the 2012 valuation and is sufficient. Asset condition and performance need more work.

9.9.3 Condition

At present, however, the default value for assets is excellent. Pipe condition testing is now being done more regularly and targeted at more vulnerable pipes. Condition testing was carried out for asbestos cement (AC) pipes in 2014 to gain further insight into expected asset lives. Some specific classes and ages of AC pipes were downgraded to a reduced expected useful life based on the testing.
Additionally, where pipes have had significantly more reactive maintenance done to them AssetFinda automatically downgrades their condition. Therefore, over time, condition will be more realistic.

9.9.4 Performance

Performance of poorly performing pipelines or assets is generally received by report or anecdotally from staff and this is used to update AssetFinda.

Council is increasingly looking to performance data prior to allocating funds for pipe renewal rather than relying on age based renewal processes.

A series of performance criteria are being developed for the water mains. The first cut (2017) implementation of pipe performance uses the recorded maintenance events in AssetFinda as supporting evidence for prioritised renewal. Council is particularly interested in understanding the cost to benefit analysis for funding pipe renewal and intends to increase emphasis on pipe performance data recording and analysis.

9.10 Processes for Recording Data and Information

Council's long term processes, recording and reporting that have been retained as current practice are outlined in the table below.

Table 9-3: Long Term Processes and Recording

Process	Procedures	Assets
Existing Processes Retained	Procedures are followed for purchase of services, materials, plant or contractors compliance with the Council's Policy Manual	
File Systems and Hard Copy Plans	Updated hard copy plans moving toward ArcGIS/AssetFinda (and Power Draft) printouts rather than manually drafted plans. The network files will contain relevant information and be reviewed every 5 years to avoid unnecessary bulking of documentation. Incorporation of ArcGIS/AssetFinda draughting packages to be a priority for data entry and plan updating (one software package used). Hard copy plans are gradually being scanned and added to Laserfiche, the Council's file archive database system.	
Identification of Upgrades and Asset Acquisitions	This has continued as an extension of previously activated processes, with the need identified through mechanisms discussed in Sections 3 and 5 of this plan. Improvements in recording of condition/performance information will assist in highlighting the need for upgrades and possible timing of works.	
Recording and Reporting Methods	This section describes the overall handling of data and information as part of the asset management process, with a move to optimise both the appropriateness and consistency of data as well as ease of retrieval. The focus toward using performance, condition and criticality scores is discussed also in Sections 4 and 5 of this AMP.	**Below Ground and Non-Mechanical Assets** Collectively pipes, valves, reservoirs, intakes, ponds, power supply cables, manhole risers and other buried components with a life of 25 years or more are recorded in ArcGIS/AssetFinda, but include fields for recording scores for performance, condition and criticality. Data can then be summarised and promptly retrieved using - • Type of asset component • Age of asset components

Process	Procedures	Assets
		• Materials used • Capacity, diameter, pressure ratings • Location • Performance and Condition scores (1-5) • Criticality score (1-3) • Risk factor (1-3)
Maintenance Entries	These are entered onto ArcGIS/AssetFinda, to create a visual record of areas of high repair input and to quickly identify those sections of reticulation, where attention may be necessary. This will also allow linkages in recording of data between maintenance inputs and renewal needs. There is currently some issue with long pipelines in identifying where single repairs occurs as opposed to the fact that a particular pipeline has been repaired a number of times. AssetFinda can be used to more accurately record Scheduled Maintenance in order to provide a more consistent Operations approach.	**Mechanical and Electrical Assets** Collectively pumps, aerators, telemetry, electrical, controls, water treatment equipment and Wastewater irrigators – (higher maintenance input), Discrete components of differing characteristics with nominal life of less than 25 years. Linkages to these assets are structured as 'Hot Shot' tables in ArcGIS/AssetFinda, where the collective asset can be picked up from an icon (at its location) which then pulls up a standard schematic displaying all the discrete components that make up the asset. There are separate schematics for pump sheds and Wastewater facilities. All the discrete components (pump, controls, flow meters, headworks and so on) can be assigned individual conditions or performance scores, age, size, comments and so on are reported as discrete items or combined for the asset of which they are part. This provides for some historical recording as well as a level of detail that is consistent with managing the assets. Risk factors and optimised renewal decision making can be applied to either the discrete component level or the whole asset. Further breakdown of the plant hierarchy is required and planned for ten next few years.
		Manual Recording All data relevant to quantifying and assessing assets will be first entered into ArcGIS/AssetFinda. As built structural drawings will be recorded Laserfiche (with a planned hyperlink to AssetFinda) and network detail/history files will remain as hard copies. Where

Process	Procedures	Assets
		renewals or upgrades render old hardcopy plans as inaccurate or redundant, they will be marked as such or discarded and replaced with an ArcGIS/AssetFinda printout. All outputs relating to asset registers and valuations will be derived from ArcGIS/AssetFinda files but with specific detail being manually recorded on plans or network files.
		Data Identification Identifiers have been assigned to buried or multiple asset components for recording data and retrieving information. Identifiers used are also compatible in format outlined in the IIMM. Node points on pipelines will be used for reticulation whereas discrete components will be assigned a number at site. Multiple assets that cannot be given a single location or name are given a dedicated asset identifier, allowing it to be traced to a location on the GIS database. This number identifier is manually generated for all assets (pipes, hydrants, manholes, valves). Specific items (pump shed, intake, reservoir, disposal site) are identified by a 'name' or 'location' and are referred to by these. Numerical identifiers are not used on named assets.
		Asset Registers The asset register (inventory) is updated in August each year, to allow the annual report to be prepared from current data and Annual Plan and Budgets from revised data. The financial forecast is a Microsoft Excel spreadsheet derived from the AssetFinda data. The normal lifecycle termination will trigger the need to allocate funding for renewal of asset components. This is carried out by the Manager of Financial Services
		Works and Services Committee Reports Unless decided otherwise, the 6 weekly collation of field data for reporting to the Works and Services Committee (WSC) will continue. Reports will continue as a manual process, but for consistency, will use the same data that has been entered into ArcGIS/AssetFinda. The content of these reports contains inputs from each network as: • Upgrade / renewal work carried out • Progress on projects

Process	Procedures	Assets
		• Current number of consumers or connections and new connections • Leaks repaired • Valves replaced • Pump faults / repairs and main pump operating hours (per day) • Flows recorded at intakes (average) • Graphical comparison of pump hours or flow against units sold
		Collection of Data from the field Condition, performance and criticality scores for the asset components, the operators and utilities staff enter relevant repairs or replacements in a standard format (other than major capital works), which are then entered into ArcGIS/AssetFinda by the sections Administration Officer Each network is updated manually from recorded observations, with at least one specific meeting between the key field and office staff each year, to facilitate this Operational data for flows, line pressures, pumping hours and other related outputs has been set up to be collected through Datran links. This has reduced time demands on operators in the field and provided a direct link to computer based filing facilities in the office. It is proposed to use the Datran reporting system to automate the download of SCADA data so providing a more regular health check of the Datran system.
		Risk Risk associated with asset failure has only been identified with 'obvious' factors that may impact on asset renewal. Any developments will be incorporated as they evolve and will be incorporated in the plan as a part of each subsequent plan review periods

9.11 Age of Assets

All asset components identified in ArcGIS / AssetFinda have been assigned an installation date with the default date being the commissioning date for the network of which they are part. Exceptions to this are shown under the bullet points below. The selected date will be the one added to the ArcGIS / AssetFinda file records and will be the one used for depreciating assets and life cycling. Exceptions are as follows:

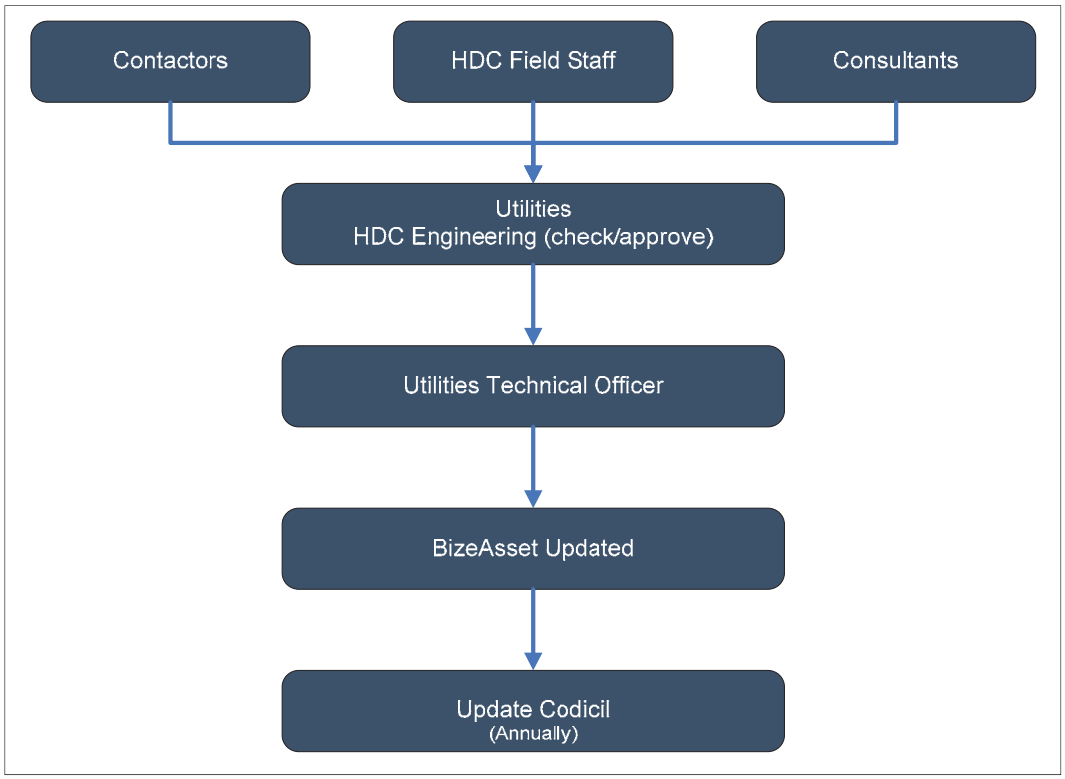
- For capital renewals or new acquisitions (Council or vestings) incorporated after the network commissioning date and that have a recorded date for installation, these assets will be assigned the recorded date
- For capital renewals or new acquisitions (Council or vestings) incorporated after the network commissioning date but where the date for installation is uncertain, past and present staff, Councillors or local community who were there at the time will be approached to determine the date and the assets will be assigned the consensus date
- For appurtenances added to pipelines, where no date is recorded, these items will be assigned the installation date of the line on which they are located
- For pump, motor, control or plant items that have clearly been replaced or overhauled completely, but no date recorded against this, these assets will be assigned a date that represents 50% of their standardised life expectancy

It should be noted that AssetFinda has a 'Found Data' field as well as an installation date that allows the user to record the fact that an asset that has been in place for a number of years may only have been found on site recently and recorded in the asset register.

9.12 Information Flow Requirements and Processes

Figure 9-3 shown below outlines the flow of information through the relevant Council departments to update the Codicils and AssetFinda.

Figure 9-3: Information Flow Process



9.13 Standards and Guidelines

Standard	Details
Legislative Requirements	
The LGA 2002	Defines the purpose of local authorities as enabling local decision-making by and on behalf of the community, and allows local authorities the power of general competence. This Act specifically requires Council's to continue to provide Water and Wastewater Services if they do so already
The LGA 1974	Provides the authority for Council to construct, operate and maintain the Water, Wastewater and Stormwater System
Health Act 1956	Places an obligation on Council to improve, promote and protect public health within the District
Historic Places Act 1993	Describes an archaeological site as "Any place in New Zealand that: • Was associated with human activity that occurred before 1900 • Is the site of the wreck of any vessel where that wreck occurred before 1900 • Is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand" It is unlawful to modify, damage or destroy any archaeological site - recorded or not without an authority from the New Zealand Historic Place Trust
The Building Act 2004	Provides a regulatory framework for building work establishing a licensing regime and sets performance standards to ensure buildings have attributes that contribute to the health, safety, physical independence and wellbeing of people
The Resource Management Act 1991	Governs all water takes and discharges. Resource consents obtained for water activities require parameters such as volume and quality to be monitored as well as taking steps to mitigate any adverse effects that may occur through the activity
Health and Safety at Work Act 2015	Council has a role to play in eliminating and minimising health and safety risks associated with their activities and facilities. This requirement relates to the whole life cycle of facilities.
Management Standards	
NZ IAS 16	Generally accepted accounting practice
IIMM Manual	The International Asset Management Manual
Electrical Regulations 1993	All Electrical work is carried out by suitably qualified personnel
New Zealand Transport Agency Guidelines	Works undertaken on public roads are carried out in accordance with New Zealand Transport Agency Guidelines 'Working on the Road'

9.14 Development of an Asset Management Culture

The on-going development and successful implementation of asset management requires an organisational culture of asset management. To be successful the asset management culture needs to be consistently modelled and supported by the Chief Executive and senior managers in conjunction with the elected Council. This process has been reinforced by the establishment of the Councils AM policy in 2009 and the AMP policy process.

9.14.1 Roles and Responsibilities of Council Staff

The roles and responsibilities of Council staff as they relate to the Activity Management Plan enactment have been defined in respect to the on-going use of the plan as this will enable the Plan to

remain relevant and current. The following table details how this is and will be carried out within Council.

	Item	How is this done
1	Organisational culture of asset management developed	AM policy in 2009
2	Council Staff understand the reasons for the plans and the implications for the long term use of them	On department basis
3	The Activity Management Plans are adopted/accepted by staff	Adopted by Council
4	Council Staff understand what is in the plans and how it could affect their day to day work including their responsibilities and reporting requirements as detailed in the different sections within the AMP	Training Programme and personal responsibilities
6	Training required in the use of the Plan (what's in it, how work is done, on-going requirements for monitoring, review and updating)	Training Programme

10.0 PLAN IMPROVEMENT AND MONITORING

Section ten details the improvements to the Asset Management systems that will increase the level of confidence in the AMP

10.1 Background

Council is committed to on-going improvement in the quality of its Water, Wastewater and Stormwater Services management practices. This is reflected in the implementation of asset management systems and associated data collection and maintenance requirements.
This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position.

The purpose of the Improvement Plan is to:

- Identify, develop and implement AM planning processes
- Identify and prioritise ways to cost-effectively improve the quality of the AMP
- Identify indicative time-scales, priorities, and human and financial resources required to achieve AM planning objectives

The Improvement Plan is subject to constant reappraisal and change. While reappraisal is an on-going process, the Improvement Plan will form the basis of the Water, Wastewater and Stormwater Services annual business planning.

10.2 Proposed AM Improvement Projects

The Council's Improvement Plan is focused on the following key areas that will provide the greatest gains for the service in the short term:

- Information Management
- Scheme Knowledge
- Risk assessments The Improvement Plan is subject to constant reappraisal and change.

While reappraisal is an on-going process, the Improvement Plan will form the basis of the Water Service annual business planning.

10.3 Improvement Programme

The 2017 Improvement Programme presented in Table 10-1 has been developed and includes:

- Items identified and carried over from the detailed assessment of appropriate AM practice for each asset group in October 2013 and updated in 2017
- Items identified during the development of this AMP

Embarking on this AMP requires Council to make condition and performance assessments on asset components, collect relevant data and extrapolate with a better measure of certainty, to ascertain when renewals (and upgrades) are likely to be required over the next 30 years and to structure funding for these.

The areas noted in this section for ongoing monitoring and refinement are those processes introduced within this AMP. Improvements focus on issues that Council considers as being pivotal in order to maintain or improve the water assets.

Table 10-1: Improvement Programme

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
1: Objectives & Issues	1.1	Strategic Goals and Strategies	Develop a new long-term vision and associated planning for the future management of the 3Waters for Hurunui District. This AMP to be integrated into the Hurunui Water Management Strategy (as indicated in the 2014 LTP)	High	At Management Level. WS/WW/SW – Long term strategy for Amberley TS updated and approved in 2017
2: Description of Assets	2.1	Adequate description of the service - Financial	Update Codicils so they can become part of the AMP but still can be used as separate document.	High	Completed within AMP by OPUS but need further update in Codicils
	2.2	Adequate description of the service - Physical			Completed within AMP by OPUS but need further update in Codicils. Investigate use of Water Outlook for live updates.
3: Levels of Service	3.1	Level of Service defined and linked to Council's role	When LOS / Performance levels are being considered - carry out assessment of how these are to be achieved and what are the gaps	High	At Management Level
			Consider what additional information/data will be required to enable Council to fully report on the performance levels. Develop standard data capture and management for pipe break performance	High	At Management Level. Service Delivery is currently investigating options for doing this in Water Outlook
	3.3	Consultation requirements defined	Consideration on the level of consultation with users will be required to set differential performance levels based on criticality	High	At Management Level
4: Managing Demand	4.1	Demand forecasts	Once latest census statistics are available - use as a basis of consideration of long term predictions for individual townships and rural water schemes. Apply latest current update from Local Government Commission Statistics NZ. Assessment should include use of local knowledge for known development. Include understanding the effects of changing occupancy rates. Process for determining demand projections to consider all trends (population, climate, usage, etc.). Understand forecast scenarios. Ensure that process is repeatable and is reviewed on an annual basis.	Med	Population projection report previously produced in 2013 by Opus.

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
			Process implemented so that Data held and updated on consents, pump capacity, peak flows. Use of AssetFinda and/or Water Outlook should be considered	Low	Procedures required for use of AssetFinda and/or Water Outlook
			Review of forecasted demand for individual schemes to assess any change needed for contributions policy	Med	Contributions policy under review at district scale by Manager Support Services.
			Data base or use of AssetFinda to record: - Storage of consents information - Well/bore information: not for consent requirements, but for storage of knowledge.	Med	This is underway in parallel with Laserfiche.
	4.2	Demand management strategies and drivers are understood, documented and undertaken	Instigate Demand strategy that contain the components of: • An overall strategy/vision that gives direction to the Management Plan • A Management Plan including objectives, risk assessments, short/long term targets (KPI's) and associated actions, timing and resources • Policies: Rules to guide both Council (staff and councillors) and the public in decisions in achieving the Management Plan outcomes • Water loss management • Monitoring and reporting of usage/flows data requirements	High	This is underway.
			Review utilisation presently held to ensure data relevant (for short and long term) and reason for obtaining is valid, confidence level of data known, and in practical and reportable format. Develop a process for the collection and analysis of data	Med	To be achieved by using Water Outlook
			Update and re-calibrate models for greater confidence in hydraulic performance and future capacity	High	Awaiting report with budgets from consultant
5: Lifecycle (LC)	5.1	Operations and Maintenance Service delivery	Consider the sharing of Engineering Standards with other similar Council's in the Canterbury region and to ensure standards are applicable to Council	Med	Consents Engineer to adopt Waimakariri DC standards with amendments for Council's issues. To be reviewed by utilities team.
			Council has basic maintenance programme but requires updating and formalizing. AssetFinda to be used to show scheduled maintenance and	High	Consider criticality approach to prioritise condition assessment, and include further condition and performance criteria to prioritise

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
			inform/report as required		renewal
			Develop planned maintenance strategies and programmes for key areas e.g. for wastewater would include CCTV, reticulation, pump stations and treatment plants.	Low	Implementing for AMP
	5.2	Asset condition performance assessment & data confidence levels	Planning to improve asset condition and remaining life data for all assets (that incorporates modelling of probable asset condition, failure records and actual condition inspections). Develop on-going planning process for regular condition assessments that are summarised in electronic form and align these to renewals forecasts (for both below ground and above ground assets). Understand pipe deterioration using national and local data and information	High	Ensure that collected data is available and useful for planning and decision making
	5.3	Lifecycle Optimised decision making	Have maintenance schedules within AssetFinda that specifies the required scope and frequency of planned maintenance activity for the service.	Low	Increased capability in AssetFinda for this in Version 4
			Develop a long-term inspection and proactive scheduled maintenance plans for all assets and linked to criticality - carried out in-conjunction with item 5.2 above.	Low	Data to be captured into AssetFinda.
			Record operation and maintenance data to inform investments regarding deferred renewal	High	Require better facilities/plant data and a review of pipeline maintenance event data to implement this
			Develop renewal programmes based on analysis of condition, performance, capacity, and risk factors. This follows on from work carried out in Section 5.2a above.	Medium	Require better facilities/plant data and a review of pipeline maintenance event data to implement this
	5.4	Asset Management Lifecycle Practice	Consider the extent of operational manuals required for the service and provide a programme for writing these based on criticality.	High	Operational manuals to be reviewed for all facilities
			It is considered that a review of the current Asset Management Policy is required to ensure that it is still at an appropriate level and contain sufficient information to provide the asset management	Medium	To be started in 2018-2019. Consider having an Asset Management Committee comprising utilities, Roading, Amenities & Finance

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
			direction in the future.		members.
			Consider the extent of Standard Operating Procedures (SOP) required for the service. Provide a programme for writing these SOP based on the risk i.e. hygienic repair procedures for water pipe repairs should be very high on list.	High	Development of SOPs is in progress. Urgent requirement. Service Delivery staff to address this issue and ensure information is passed to Asset Engineer for capture on AssetFinda. This will be updated to the WSPs and next AMP review for water services.
6: Risk Management	6.1	Identification of critical assets	Continue to develop and automate criticality assessments	Medium	Criticality framework developed and implemented in 2017. Continued review and application is required, especially for facilities assets
	6.3	Identification of risks and risk strategies	Develop a disaster plan for rapid and structured response to emergency failures and significant hazards. Develop health & safety plans and incident control plans for critical facilities (these can be part of the Operations Manuals). Use existing constraints mapping (effects of flooding, liquefaction etc.) and consider effects and mitigation.	Med	Disaster plan not done H&S plans and SOPs are in progress. Further work required using 2016 earthquake data to update estimation of natural hazard risks.
			Set up programme for the review and updating of WSPs.	Med	All WSPs have been completed and approved. Some updates will be required following the findings of the Havelock North Inquiry and changes in treatment requirements. Ongoing review is included in future activity programme.
			Discuss with Council's committees on the extent of insurance – affordability issue. Determine the appropriate practice for the level of risk management that will be adopted for the Council and then develop a Corporate Business Risk Policy.	Med	Manager Support Services has suggested that this will be discussed following AMP inputs showing identified insurance gaps.
			Implement risk management mitigation and controls identified within the risk analysis.	Med	At Management Level

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
7: Financial Management	7.1	AM financial planning for m'tce, renewals and capital projects for at least the ensuring 10 years	Assumptions, process: - Identify the assumptions that may have an impact on the 2018 LTP - Obtain agreement by Council at early stage	Med	At Management Level
	7.2	Reconciliation between asset planning and financial planning	Develop a regular monthly or automated reconciliation between asset planning and financial planning to improve the frequency of review from the current annual period	Low	Requires designation of finance team member to work alongside asset engineers
8: Practices and Processes	8.2	Asset Management systems functionality	Review the programme for completing required asset attribute and condition data capture into AssetFinda on a prioritised basis (using criticality) and document on-going updates and reviews to support asset management processes.	Med	Budgets in place for condition assessments. Programme being implemented.
			Reporting on complaints received - smells, appearance, taste, pressure, disruptions and complaint response time.	Med	.
			Review the component level of assets held within the asset register and consider the need to record the assets to that level for valuation purposes and consider incorporating with other assets within the unit rates for replacement to simplify the current process.	Med	Need further work on Facilities/plant data, This is to be started in 2018/2019
			Implement effective document control to ensure currency of vital information held in O&M strategy, design manuals, construction standards and business continuity plans.	Med-High	Ongoing revisions required. Use of Laserfiche in conjunction with AssetFinda being investigated.
			Improve confidence in facilities/plant data by checking in situ facilities. Determine a consistent & formalised arrangement for facilities by improving hierarchy and visual layout.	High	Improved formal set-up for new plant data in AssetFinda. Awaiting field data to implement setup of existing plants.
			Review "As built" process and contractors work sheet for appropriateness.	Med	Presently being carried out
			Implement a QA system for asset management and a procedure is	Med	To be done in 2018-2019

AM Area	Item #	AM Component	Specific Asset Management Improvements	Priority	Comments
			required for updating maintenance data from the field to the office. Improve accuracy of data through review and modification of collection, storage, and auditing with prioritising on criticality including the development of Data management standard.		
			Further develop asset management system modules to analyse planned vs reactive maintenance.	Med	No progress to date
9: Improvements and advances	9.2	Appropriate improvement programme	Develop a projects database and processes to record all planned and potential Capex projects and enable prioritisation of projects.	Low	Started utilising ArcGIS shapefile and excel spreadsheet for this work. Requires formal procedure to ensure that updates are made consistently.

10.4 Development of an Asset Management Culture

The on-going development and successful implementation of asset management requires an organisational culture of asset management. To be successful the asset management culture needs to be consistently modelled and supported by the Chief Executive and senior managers in conjunction with the elected Council. This process has been reinforced by the establishment of the Council's AM policy in 2009 and the AMP policy process. Further improvements are in process with the designation of a member of the financial team to work alongside the Asset Engineers. It may be prudent to have an asset management committee with representatives from all engineering disciplines and the finance team to provide a more consistent approach and allow development of the AM policy

10.4.1 Timetable for Audit and Review

The programme for future AM Reviews of this plan is in Table 10-2 below:

Table 10-2: Timetable for Audit and Review

Activity	Target Date
Asset Management Improvement Programme 6 monthly meetings with Asset Managers	6 monthly
Improvement Plan reviewed annually by all staff directly involved and focusing on key business issues	30 June each year
Report on Improvement Plan	30 June each year
AMP updates involving members of staff involved in preparing specific aspects of the AMP	30 June each year
Adoption of AMP by Council	30 June every 3 years
External benchmarking by internal staff	Annually
Audit NZ external audit	As required by Audit NZ

APPENDICES

The appendices detail the supporting information for summarised information in the AMP

Appendix A Natural Hazards & Risk
Appendix B Review of DIA Mandatory Performance Measures

APPENDIX A NATURAL HAZARDS & RISK

A1. Natural Event Risk Assessment and Managing Risk

This Section considers risks to the integrity and functioning of infrastructural (utility) assets arising from natural hazards. It is prudent to identify key hazard prone areas and develop longer term procedures for mitigating impacts and planning service reinstatement where situations arise that can disable or damage Water & Wastewater assets.

A primary focus is vulnerability of assets and access to these under emergency conditions. This ties in with the Hurunui Lifelines Project and the Civil Defence Emergency Operations Centre (EOC) and seeks to parallel impacts on service delivery under the same or similar events.

1. Natural Hazard Groupings

- Flood
- Earthquake
- Landslide, mass movement and inland erosion
- Fire
- Meteorological events (rain, hail, sun, frost, drought, wind, snow)
- Coastal effects and erosion
- Location influenced effects (access to sites where damage is inflicted) have been incorporated into the risk framework as there is an increased consequence (Levels of Service) of any damage due to time delays. The latter could have adverse effects during a district wide civil emergency, if a failure of a water main further impeded transport or increased the level of damage arising from the natural event

Priority for Dealing with Impacts from Natural Hazards
It is generally recognized that earthquake impacts have potential to be most damaging as severity will have consequences for all above and below ground assets and may cause total failure. The focus for recovery will be most demanding in such instances.

Flood is next on the list and damage can be significant, but more localized. Landslide damage (depending on causes) can be severe (total failure) but is again very localized. The impacts of fire are not known but are localized and limited to above ground assets only.

Metrological hazards will tend to impact on access and power supplies more than our own assets, other than the cumulative effect of drought on soil movement and pipe stress. These are considered lower risk events, through having much lower vulnerability and a more manageable consequence.

2. Priority for Reinstatement of Services

Initiatives will apply to staff/emergency service prioritizing of recovery work. Few exist as at June 2006. Asset failure arising from natural hazards will involve high public awareness of the event (flood/quake/major fire). Managing reduced and erratic Levels of Service will be aided to some extent by such public awareness and that prevailing conditions are not normal, hence expectations of continued service levels will be lower.

Priority for Water Reinstatement is to be considered as:

- Continuity of supply from each intake or if non-recoverable, securing alternative sources for essential supply needs (tankered water, linking to other sources)
- Maintaining water quality if necessary, through manual chlorination
- Reinstatement of electrical energy supply or if this is unduly delayed, provision of generator or fossil fuel driven pumps for essential level of supply

- Reinstatement of major pipelines to key reservoirs and subsequent repair or replacement of smaller and minor feed lines
- Ensuring water is available at key points for individual collection on road routes that are unlikely to be significantly damaged (avoiding access over larger bridges)
- Use of emergency communications to advise consumers of limitations in supply and access to water supply points where pipe lines are inoperative
- Repair of minor feed lines and smaller reservoirs/pump stations, as resources allow
- Full evaluation and reporting damage and recovery/reinstatement

3. Flood

Flood risk is viewed as asset inundation or scour damage, not land movement associated with flood. Flood can also incorporate surface/shallow water quality risk (frequent) as well as the potential to disrupt functioning of supplies through extensive damage to assets (infrequent occurrence – medium to high consequence).

There are two rainfall patterns influencing flooding. The first is heavy nor'west rains in the mountains and the impact this can have on the two major rivers within the district (Hurunui and Waiau). With water [and sewer] networks, these events have limited area of impact but can have a high impact on water quality for some networks. Shallow river fed aquifers can also be affected by these events. There is usually some delay between the event and discoloration of rivers, which provides for pre-event warnings.

The other pattern is heavy and/or prolonged rain from the east and south-east sectors, which impacts more on the coastal edge of the district. The four worst recorded floods are linked to this rainfall pattern. Events can create problems with surface water (standing) and sewer infiltration. Both issues that have environmental and public health consequences where operation is hindered or assets become inoperable.

Flood events are not widespread over the entire district. Known areas that are prone to flooding and their impact on assets are:

Location Potentially Affected by Flood	Impact on Water	Impact on Sewage
• Amberley and Leithfield Beach Settlements		☑
• Waipara river flats and the Waipara town supply bores.	☑	
• Leithfield area from Kowhai River and coastal drains.		☑
• Low lying areas west of Amberley (Watties & Stanton Roads).		
• Hawarden township and environs and Waikari River flats		☑
• Culverden town and Pahau River	☑	
• Waiau township and environs from Mason River	☑	
• Mina flats adjacent and west of Cheviot		☑
• Spotswood/Parnassus river flats	☑	
• Chatterton/Rogerson River areas at Hanmer Springs	☑	☑
• Hurunui/Waiau river flats and adjacent bank scours	☑	

Much of the historic information on severe flood events has been prior to commissioning community water and sewer assets. Only events post 1967 will have specific benefit in predicting impacts on asset performance and consequent adverse impacts –

- Sewer pond overtopping and excess discharge for Cheviot sewage (Mina flat flooding extending to depth of 2.0m

- Flood damage of Rogerson water intake at Hanmer Springs (1996)
- Flood damage to Hurunui Main intake (in 1970 and 1992), damaging gallery and writing off pumps and controls
- Overflowing of Hawarden ponds and damage to pumps (1993)
- Minor damage to Waiau town intake (June 1992)
- Ongoing erosion on river flat where Kaiwara bores are located

Mitigation is largely limited to providing temporary protection from flowing water and gearing up for boil water notices/manual chlorination for schemes affected by poor water quality. Some schemes have duplicate intakes (where practical) and town intakes/sewers have generator connections.

4. Earthquake

Earthquake events are "seen" as high impact, capable of crippling most of the districts utility infrastructure for extended time. This scenario is totally dependent on the severity of the quake and the soil types shaken. History shows effects can be widespread and devastating. There is no simple means to trigger probable extent of damage, but regional models show intensity (and probable risk) increases toward the Alps and Kaikoura Range. The 2016 Kaikoura earthquake caused significant damage to Waiau Township, Waiau Rural, Chevoit and Parnassus schemes and remedial considerations are at present being investigated, defined and agreed upon with our insurers (above and below ground) at the time of this AMP review

5. Landslide, Mass Movement and Erosion.

Landslides are often associated with earthquake shaking and the effects of prolonged rainfall. They tend to be localized and limited in their impact on utility assets as well as being quite hard to predict. Buried pipes and access tracks are key elements affected by these hazards. Some higher risk (prone) localities are identified already and replacement or new pipelines take these into account (not yet mapped on GIS – June 2006).

Steeper slopes, unstable sections of ground, wet slopes and past landslide sites tend to be avoided when upgrading or renewing pipes. In some instances, these cannot be avoided without undue expense and options like braced surface steel pipe, strategically located pipe or PE are used to limit the extent of damage that may arise from an event.

Mass movement applies for slopes/areas that are slowly moving and not generated by any one trigger event. Areas where council has pipelines in these conditions are:

- Upper sections of the Waiau Rural Supply (Wandle)
- Motunau, Coastal end of Reeses Road, Vulcan, East of Davaar Reservoir, Greta Cutting and above main intake on Hurunui #1 Supply
- Hendersons/Daltons area and One tree Hill on Parnassus Supply
- Random Spur, Sloss Pump and Glenmout sections of Kaiwara Supply

Failure due to mass movement and larger scale pipe wrenching over the past 30 or so years appears to be minimal. Large movements may however, generate the need for substantial pipe replacements when and if they occur. No reservoirs are known to be at risk from mass movement or landslide.

Known areas of inland sheet erosion do not affect utility assets.

Impact of slides or mass movement (unless coincidental with a substantial earthquake) are to be managed through immediate pipe replacement. Outage may occur for up to 72 hours, mitigated only by consumers maintaining at least 3 days storage. Risk periods for both these events tend to be wet winter/spring when stock demand for water is low.

Maintaining stocks of mainline size pipe in each water store provides for minimal delay in responding to failures (effective 2002). Where events are localized, local contractors are available at very short notice to assist in reinstating supplies.

6. Fire

Fire is included as a natural hazard, but is not part of the Hurunui District Lifelines Natural Hazard Assessment. With an increasing number of polythene tanks used as reservoirs, fire may well present a hazard that disables continuity of water supply and may also interfere with pump stations and power reticulation.

The impact of fire is not well documented, but events exist where fire has damaged power supply to intakes. The risk is certainly greater in forested areas (Balmoral, Hawarden-Waikari, Hanmer Springs and Ashley) but may arise also in urban and grassed areas as well.

Severe drought has heightened awareness of open fire as a hazard. Electrical fault fires at pump stations and localized fire events where our assets are on shared commercial or industrial sites (Rayonier NZ Ltd - Forests at Sefton) are not included in this hazard category.

7. Meteorological Hazards

Rain
Rain presents no hazard to assets other than contributing to flood or landslide (covered in preceding sections). Rain creates management issues with land based sewage disposal (as it can limit the ability of the soil to accommodate effluent loads) and with water quality from surface or shallow bore intakes (manageable). This is not seen as a natural hazard as it is "expected" and must be provided for in management plans and consent conditions. Rain contributes to access hazards (operators and contractors) with remote off road sites.

Hail
Hail is not seen as a hazard that generates risk on our assets, power supplies or access.

Sunlight [Intensity & Heat]
Sunlight is not a hazard from a short term perspective but can weather plastics, coatings and has a consequence on the anticipated lifespan of some above ground items. This is a management consideration in our selection of materials and projected lifecycle of components. Where summer heat is likely to impact on operating temperatures within pump sheds (electronic controls), provision can be readily made by insulation and or ventilation of the sheds. These impacts have arisen and are easily remedied.

Frost
Frost presents a frequent, but very low risk hazard with freezing exposed pipes, pumps, reservoir connections and disposal of effluent. Mitigation is afforded through lagging, burial to depth or covering assets. Consequence of damage is generally small, localized and simple to remedy. Access constraints arising from frost and impacts on power supply or (weighting on suspended power lines) are inconsequential. Water demand is low to average at such times, but sewage volumes may be average to high.

Drought
Drought can impact on buried assets through surface soil movement to around 1m depth (swelling and shrinkage with changing moisture content of clay soils), noted on 65 – 100mm AC mains and some 100 – 150 glued joint PVC lines in clay sub-soils. No impact has been recorded (2003) on RRJ pipes, sewer lines or polythene.

The effect on these pipes is also thought to be linked with age of the material (cement leaching/wall softening on AC lines) and the operating pressure that the line experiences (including water hammer and pump surging). The effect is slow and occasional with low to moderate consequences. Risk is considered minor as leaks generally occur in summer where they can be readily observed and repair attended to promptly.

The more significant consequence of drought is on the capacity of catchments to supply water. This is considered as a natural hazard as it is expected from time to time, cannot be controlled and has an adverse effect on being able to maintain Levels of Service. Drought impacts apply to both surfaces and shallow groundwater sources.

There is no drought risk associated with sewage treatment but can heighten environmental effects where discharge is to small waterways (low/no flow conditions, elevating impacts of discharge). Drought enhances land based disposal from a soil/water angle, but can reduce benefits in that ponds have low sewage inflow/high evaporation, thereby limiting the availability of effluent volume. Consent conditions address this seasonal effect.

The seasonal effects creating water shortfall are different for inland catchments (nor'west rainfall, catchment size and alpine snow melt) compared to foothills streams and/or coastal environments (easterly rains and smaller, more variable recharge). The more extreme events are found in the coastal areas with shallow groundwater and surface water takes. The majority of water intakes are linked with inland catchments.

Wind
Wind is a frequent hazard, with typically low consequence. Impacts are limited to above ground components. Pump-sheds, plastic reservoirs, treatment structures and effluent irrigation plant are most at risk. Particular caution is paid however, in keeping minimum water levels in plastic reservoirs.

Wind impact on power reticulation to pumping stations is more frequent and creates outages (usually hours, not days). This aspect is addressed by the electricity reticulation companies and not Council. Wind damage can be mitigated through having access to generators during power outages.

Snow
Snow risk is limited to pump, reservoir and reticulation access. Heavy falls vary between localities, but are considered as a 5 –10 year occurrence, from a risk management perspective. Consequence is generally low as the snow does not damage assets as such.

There are no large utility structures that are prone to snow loadings. Pump sheds are small and reservoirs are not unduly stressed by snow loads. Snow (as for wind/frost) can impact on electrical power reticulation lines (above ground), but frequency is very low.

8. Coastal Erosion

There are no Water or Wastewater assets at risk from coastal erosive processes at present. The most coastal Wastewater site is at Amberley and while the beach is being currently progressing inland at up to 1m/year, the disposal site is at no risk from this. Some water pipes serving Leithfield Beach, Amberley Beach and Motunau Beach may be at risk over the next 50 years (as will be properties serviced). Risk is minimal from asset management viewpoint, but this hazard requires due consideration when HDC renews existing assets in context that a pipeline asset can have a predicted asset life in excess of 100 years.

9. Location Hazards

Asset location is included as part of risk profiling and managing risk from hazards (refer introduction). Location hazards encompass:

Pipe under Road or Rail Corridors
Pipe laid in supporting conduits and with sufficient cover and bedding under roads and rail are not seen as at any greater risk than pipes located in less dynamic locations. This is in part with the added protection of a conduit (lower potential for failure) and partly because any failure will not damage the carriageway (reduced consequence of failure).

Most road and rail crossings are in small bore pipe (32mm or less). All but three water and sewer networks have more than two crossings where the main supply line passes under state highways, arterial roads or rail. The spread of these risk points is extensive. While the majority of crossings are over low volume roads, failure of pipes at unprotected crossings can also reduce service levels for major roads and increase risk of accident. Costs or reparation are also very high for highways and arterial roads.

Most road/rail crossings are either quite shallow (700mm pipe cover or less) and only ten (as at June 2006) are located within protective conduits. Placing valves either side of the road/rail to isolate flow where failure occurs can mitigate effects of failure. Risk is being mitigated with new crossings or renewal works through using:

- Protective conduits over the active section of pipe
- Using non jointed sections of PE pipe to minimize joint failures under roads
- Using higher pressure rated pipe on crossings
- Valving larger pipe on both sides of crossings
- Laying pipe a greater depth to minimize dynamic/flood flow effects

Hazard identified crossings for all sewer and water networks are tabulated below. These totals do not include road crossings within 50km/hr zones in urban areas.

Scheme Name	Scheme Type	SH1 Road	District Road	Rails	Stream
Amuri Plains	RW	6	29		1
Ashley	RW	2	444	9	6
Balmoral	RW	1	18		
Blythe	RW		8		2
Cheviot	RW	10	107	5	17
Hurunui #1	RW	10	110	9	9
Kaiwara	RW		35		5
Lower Waitohi	RW	5	20	2	6
Parnassus	RW	3	12	3	10
Patons	RW		20		
Peaks	RW		14		
Upper Waitohi	RW	2	60	1	3
Waiau RWS	RW		12		8
Amberley	UW	11		1	1
Leithfield Beach	UW				
Waipara	UW	2	1	1	
Haw-Wai	UW	1	15		4
Culverden	UW	6	4		1
Waiau Township	UW	2	2		
Hanmer Springs	UW	5	11		2
Amberley	S	3	4	1	
Cheviot	S				
Motunau	S		1		1
Greta Valley	S		1		
Waikari	S		1		2
Hawarden	S		3		
Hanmer Springs	S		5		1
Totals:		**69**	**937**	**32**	**79**

Stream, River or Swamp Crossings
Pipe crossings over streams do not create secondary risk as failure will have little effect on the waterway. They are included because potential for damage to pipes is higher in these locations arising from the high energy events during high stream flows. This is of concern as some pipe crossings over streams have little cover or are partly exposed.

Swamp areas are included, as access is typically more difficult for repairs and the acidic conditions arising from wetland biological activity can exacerbate pipe corrosion/erosion with steel and AC materials. Lifecycles are typically lower and with these environments occurring often at low points along a pipe route, pressures are often higher and this further increases risk of failure.

Mitigation of risk is through using the following when replacing ort upgrading lines:

- Above ground structures over streams where possible, or attaching to road bridges
- Duplicating stream or river crossings where possible in different sections of the bed
- Using steel or concrete capped sleeved conduits to provide additional strength
- Moving pipe routes (where economic) to higher areas or more secure stream beds
- Incorporating at risk crossings into ring main feeds to provide for continuity of supply

Difficult Access Terrain
This covers access to remote or off road sites that may be rendered inaccessible after events. Very little can be done with most sites off main access routes, as the cost of protecting or maintaining access at all times is prohibitive. Constraints are managed by:

- Having more than one route into each remote site, where this is practicable
- Access to suitable machinery to operate under more extreme conditions
- Use of helicopters to access sites (last resort for repairs)
- Reliance on maintaining relations ships with local communities to assist
- Relocating pipes, pumps and reservoirs to more accessible locations
- Relocating intakes or reconfiguring intakes to lessen impact of flood waters
- Increasing storage at boost pumps/on-farm to accommodate slower access

A2. Natural Hazards, Impacts And Mitigations

Appendix Table 1: Hazard Impacts and Mitigation (Water and Wastewater Systems)

Natural Hazard	Impact	Risks	History	Mitigation in Place
Earthquake	High	There is considerable data on known fault lines within the district. Hurunui has more active faults than any other district in Canterbury and most other developed areas country wide.	Earthquake history exists for the district, but almost all of this is pre-utility asset installation. The known high impact events are: • Amuri 01/09/1888 M 7.0 - 7.3 Moderate to severe damage • Cheviot 16/11/1901M 6.9 – 9 Moderate damage, rock slides • Motunau 25/12/1922 M 6.5 – 6.7 • Waiau 23/05/1948 M 6.4 • Cheviot 10/01/1951 M5.5 • Hanmer Springs 29/08/1996 M5.5 No damage to utility assets • Kaikoura Earthquake 14/11/16 M7.8 Significant damage to Waiau Township, Waiau Rural, Cheviot & Parnassus schemes.	Planning is focused on recovery of asset when failure and access to assets is limited. Avoiding damage cannot realistically be seen as viable in all cases. Minimising damage may be achievable in some areas (location of pipes and plant), but is limited to a first hand and well documented understanding of likelihood of damage from a very localized perspective at the time of introduction, renewal or upgrading of each asset component Use of more resilient materials (ie – PE pipe instead of AC and PVC) on major lines. Further investigation of resilience of schemes with increased storage provision at pump stations.
Landslide, Mass Movement and Erosion	High	Landslides are often associated with earthquake shaking and the effects of prolonged rainfall. They tend to be localized and limited in their impact on utility assets as well as being quite hard to predict. Buried pipes and access tracks are key elements affected by these hazards. Some higher risk (prone) localities are identified already and replacement or new pipelines take these into account	Mass movement applies for slopes/areas that are slowly moving and not generated by any one trigger event. Areas where council has pipelines in these conditions are: • Upper sections of the Waiau rural supply (Wandle) • Motunau, Coastal end of Reeses Road, Vulcan, East of Davaar reservoir, Greta Cutting and above main intake on Hurunui #1 supply. • Hendersons/Daltons area and One tree Hill on Parnassus supply	Failure due to mass movement and larger scale pipe wrenching over the past 30 or so years appears to be minimal. Large movements may however, generate the need for substantial pipe replacements if they occur. No reservoirs are known to be at risk from mass movement or landslide Maintaining stocks of mainline size pipe in each water store provides for minimal delay in responding to failures. Where events are localized, local contractors are available at very short notice to assist in

Natural Hazard	Impact	Risks	History	Mitigation in Place
			• Random Spur, Sloss Pump and Glenmout sections of Kaiwara supply	reinstating supplies

Natural Hazard	Impact	Risks	History	Mitigation in Place
Fire	Medium	Fire is included as a natural hazard, but is not part of the Hurunui District Lifelines Natural Hazard Assessment. Fire may interfere with pump stations and power reticulation to facilities The risk in certainly greater in forested areas (Balmoral, Hawarden-Waikari, Hanmer Springs and Ashley) but may arise also in urban and grassed areas as well	The impact of fire is not well documented, but events exist where fire has damaged power supply to water intakes	Severe drought has heightened awareness of open fire as a hazard. Electrical fault fires at pump stations and localized fire events where Council's assets are on shared commercial or industrial sites (Rayonier NZ Ltd - Forests at Sefton) are not included in this hazard category
Meteorological Hazards				
Rain	Low	Rain presents no hazard to assets other than contributing to flood or landslide (covered in preceding sections). Rain creates management issues with land based sewage disposal (as it can limit the ability of the soil to accommodate effluent loads) and with water quality from surface or shallow bore intakes (manageable)		This is not seen as a natural hazard as it is "expected" and must be provided for in management plans and consent conditions. Rain contributes to access hazards (operators and contractors) with remote off road sites
Hail	Low	Not recognised as a hazard that generates risk on water assets		
Sunlight [Intensity & Heat]	Low	Sunlight is not a hazard from a short term perspective but can weather plastics, coatings and has a consequence on the anticipated lifespan of some above ground items		This is a management consideration in our selection of materials and projected lifecycle of components. Where summer heat is likely to impact on operating temperatures within pump sheds (electronic controls), provision can be readily made by insulation and or ventilation of the sheds. These impacts

Natural Hazard	Impact	Risks	History	Mitigation in Place
				have arisen and are easily remedied
Frost	Low	Frost presents a frequent, but very low risk hazard with freezing exposed pipes, pumps, reservoir connections and disposal of effluent		Mitigation is afforded through lagging, burial to depth or covering assets. Consequence of damage is generally small, localized and simple to remedy. Access constraints arising from frost and impacts on power supply or (weighting on suspended power lines) are inconsequential. Water demand is low to average at such times, but sewage volumes may be average to high
Drought	Low	Drought can impact on buried assets through surface soil movement to around 1m depth (swelling and shrinkage with changing moisture content of clay soils)	Records show failure has occurred on 65 – 100mm AC mains and some 100 – 150 glued joint PVC lines in clay sub-soils. No impact has been recorded (2003) on RRJ pipes, sewer lines or polythene	There is no drought risk associated with sewage treatment but can heighten environmental effects where discharge is to small waterways (low/no flow conditions, elevating impacts of discharge). Drought enhances land based disposal from a soil/water angle, but can reduce benefits in that ponds have low sewage inflow/high evaporation, thereby limiting the availability of effluent volume. Consent conditions address this seasonal effect
Wind	Low	Wind is a frequent hazard, with typically low consequence. Impacts are limited to above ground components. Pump-sheds, plastic reservoirs, treatment structures and effluent irrigation plant are most at risk Wind impact on power reticulation to pumping stations is more frequent and creates outages (usually hours,	NA	NA

Natural Hazard	Impact	Risks	History	Mitigation in Place
		not days). This aspect is addressed by the electricity reticulation companies and not Council. Wind damage can be mitigated through having access to generators during power outages		
Snow	Low	Snow risk is limited to pump stations and reticulation access. Heavy falls vary between localities, but are considered as a 5 –10 year occurrence. Consequence is generally low as the snow does not damage assets as such		There are no large utility structures that are prone to snow loadings. Pump sheds are small and reservoirs are not unduly stressed by snow loads. Snow (as for wind/frost) can impact on electrical power reticulation lines (above ground), but frequency is very low
Coastal Erosion	Low	There are no water assets at risk from coastal erosive processes	NA	NA
Location Hazards				
Pipe under Road or Rail Corridors	Medium/Low	Most road and rail crossings are in small bore pipe (32mm or less). All but three sewer networks have more than two crossings where the main supply line passes under state highways, arterial roads or rail. The spread of these risk points is extensive. While the majority of crossings are over low volume roads, failure of pipes at unprotected crossings can also reduce service levels for major roads and increase risk of accident. Costs or reparation are also very high for highways and arterial roads	Council have identified hazardous crossings that are tabulated in the table in APPENDIX A	Risk is being mitigated with new crossings or renewal works through using: • Protective conduits over the active section of pipe • Using non jointed sections of PE pipe to minimize joint failures under roads • Using higher pressure rated pipe on crossings • Valving larger pipe on both sides of crossings • Laying pipe a greater depth to minimize dynamic/flood flow effects
Stream, River or		Potential for damage to pipes is higher in these locations arising		Mitigation of risk is through using the following when replacing ort upgrading

Natural Hazard	Impact	Risks	History	Mitigation in Place
Swamp Crossings		from the high energy events during high stream flows. This is of concern as some pipe crossings over streams have little cover or are partly exposed Swamp areas are included, as access is typically more difficult for repairs and the acidic conditions arising from wetland biological activity can exacerbate pipe corrosion/erosion with steel and AC materials. Lifecycles are typically lower and with these environments occurring often at low points along a pipe route, pressures are often higher and this further increases risk of failure		lines: • Above ground structures over streams where possible, or attaching to road bridges • Duplicating stream or river crossings where possible in different sections of the bed • Using steel or concrete capped sleeved conduits to provide additional strength • Moving pipe routes (where economic) to higher areas or more secure stream beds • Incorporating at risk crossings into ring main feeds to provide for continuity of supply
Difficult Access Terrain		This covers access to remote or off road sites that may be rendered inaccessible after events. Very little can be done with most sites off main access routes, as the cost of protecting or maintaining access at all times is prohibitive		Constraints are managed by: • Having more than one route into each remote site, where this is practicable • Access to suitable machinery to operate under more extreme conditions • Use of helicopters to access sites (last resort for repairs) • Reliance on maintaining relations ships with local communities to assist • Relocating pipes, pumps and reservoirs to more accessible locations • Relocating intakes or reconfiguring intakes to lessen impact of flood waters • Increasing storage at boost pumps/on-

Natural Hazard	Impact	Risks	History	Mitigation in Place
				farm to accommodate slower access

A3. Mitigating and Managing Network Failure due to Natural Hazards

The bulk of assets are below ground (reticulation). Placement of assets to minimize risk of failure can only be assumed to have occurred (to some extent) during earlier planning but observation suggests this process did not apply particularly well in placing key assets.

The following is a first cut approach (June 2006, revised 2017) to managing natural hazard risks and minimizing the impact of hazards.

1. Identify slip, landslide, fault line, flood, erosion prone sections of buried reticulation, intakes, pump stations and reservoirs and to map these as hazard locations (under a separate layer) on our GIS database over time, as resources allow. Data from the 2016 Kaikoura earthquake is available and further time is required for analysis. A future project has been identified for coordination between the Asset Team and GIS Team to provide this mapping.
2. Identify sections of reticulation that serve significant numbers of consumers (public health) or large land areas (stock health) that are difficult to access (hard terrain), limited track access and water/drainage constraints and mark these sections (under a separate layer) on our GIS database for rural supplies and urban water intakes. The criticality assessment established in 2017 has included these aspects of managing network failure.
3. Identifying ring/loop main opportunities when upgrading reticulation so that as many consumers as practicable have opportunity of supply within a network from more than one reticulation link and/or supply point. The criticality assessment established in 2017 has included these aspects of managing network failure.
4. Maintaining more than one point of access to key intakes, reservoirs, boost pumps, supply mains, facilities from alternative road locations and across differing terrain, so to minimize the risk of an individual event having a similar impact on access. An investigation on portable generation requirements throughout the district is programmed for 2020.
5. Providing permanent or portable generator/ pump connections on water intakes, key water boost pumps and sewage pumping facilities, to cater for power outages.
6. Replacing all road/rail crossings in protective conduits where opportunities allow.
7. Providing all networks (where practicable) with more than one water source and to work towards each water source abstracting from a different catchment type and/or locality in order to minimize the risk of all water sources failing under a single hazard event (example being bores as well as surface takes).
8. Proposed water supply bylaws state that consumers must have a minimum of 3 days storage on their property (dependent on the supply that is taken, i.e. – 1 unit at 1,800 l/day will require 5,400 litres of storage whereas 10 units will require 54,000 litres).
9. Maintain adequate stores of PVC/PE pipe and common fittings at depots for each water supply network and sewage scheme. These should be limited to mainline and larger lateral sizes, sufficient to cater for a 300m mainline pipe failure (smaller networks/depots) or 750m pipe failure (large or multiple networks/main depots).
10. Providing catchment spillover or alternative Wastewater collection within sewered areas to accommodate sewer main failures during emergency situations that will avoid or mitigate environmental and public health risks.
11. Develop information databases that are compatible with civil defence teams, are readily understood by other emergency services and contractors (who may be operating in the field during these times) and are readily retrievable.
12. Ensure that the network codicils (AMP) are developed to contain up-to-date information known risk areas (GIS) and highlight newly identified risk sites and in a manner that will allow for these areas to be considered for remedy or alternative placement (that will address the risk) during renewal/upgrade proposals.

A4. Mapping and Documenting Hazard Sites

Mapping known natural hazard areas and historical risk locations as they impact on Water/Wastewater utility assets should be encouraged as an integral feature of hazard management. At present, areas of known hazards are primarily limited to the experience of staff, particularly the field based water operators. This is good enough for operational purposes, but a more comprehensive and reliable approach is necessary for reporting and planning for minimizing the impact of hazards on service levels.

Broad-base Categories of Information
Council began collating known flood and earthquake hazards, part of which was within the Lifelines Project (post 2002). Some of the more well-known flood/fault-line areas have since been incorporated into MapInfo GIS layers. Using existing GIS layers is the preferred approach as:

- Information is more consistent with other agencies (ECan, IGNIS, Civil Defence, NZTA, KiwiRail, MainPower, DoC, MoE, neighbouring TA's)
- Information is consistent across all departments of Council
- The information is sourced from a greater database and engaging a much broader level of expertise than the utilities section could hope to muster
- The cost of ascertaining this information is secured across a number of parties/agencies and does not pose a financial burden on any utility
- Information updates apply equally to all agencies and are independent of material determined by the utilities section of Council

This information is considered broad-base as it is more probable that it will look at risk areas on a regional or national scale. As at June 2006, little of this information applies directly to water/Wastewater assets, as internal resources have not provided for this.

Specific Information
Much of the experience gained by the Utilities section of Council, from staff and contractors, relating to hazards on a micro-environ scale is missing from the wider district data (GIS). A detailed layer (or layers) of site specific information would provide access to readily update-able material on all utility assets that would be at risk of damage.

Examples of how the information could benefit decision making are:

- Minor slip/land-movement events or sites prone to localized instability which pose a real risk in severing pipelines during "normal" prolonged wet periods or non-extreme seismic/climatic periods
- Stream beds away from roads and urban areas which have buried or above ground pipe cradles which in flood, poses a hazard to these structures
- Areas where back-water or localized ponding may interfere with proper functioning of assets or access to them
- Reservoir sites where the ground may move or weaken during seismic events
- Surface water intakes where surface flooding or river levels may impact on the quality of water and continuity of supply
- Access tracks which are difficult to traverse in wet weather or snow

Over time, these locations should ideally be mapped on GIS on a separate layer to the larger hazards, as they apply only to managing water and Wastewater assets. It is not seen as beneficial to clutter up any "common" usage layers with these specific hazards.

Presenting Information
Both general hazard and utilities specific GIS layers would be available to all internal GIS users and can be provided as hard copies where required. Each Activity Management Plan codicil would contain a GIS map showing these natural hazards. Once set up with base data/information, hazard layers should be updated as information comes to hand.

A5. Emergency Response

Utility services are considered key services and maintenance or recovery/repair of these during and after a Civil Defence emergency has been declared is a high priority for Council.

There will be other utility staff associated with the EOC operation in Logistics and Planning/Intelligence who can bring additional local knowledge to the EOC team.

APPENDIX B 2015 REVIEW OF DIA MANDATORY PERFORMANCE MEASURES

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
PM 1.	Safety	Meet bacterial compliance under the DWSNZ. Less than 1 e-coli per 100ml of drinking water tested.	a). Bacteria compliance	0% failure	All water supply e-coli tests undertaken to identified sample points across all drinking water schemes will have zero non-compliance. Tests records are kept in WINZ database.	Chlorinator or MIOX plant failure, malfunction or incorrect settings. Resultant poor or absent FAC residuals in supply pipelines to treat e-coli to acceptable DWSNZ levels.	The pipelines will be tested regularly for FAC results. Routine monitoring of chlorinators and MIOX plants to ensure correct settings and functional operations.
	Safety	Meet protozoal compliance under the DWSNZ. Accredited treatment system in place to meet log-credit rating of receiving environment providing the drinking water.	b). Protozoa compliance	*Not yet*	Financial strategy in the Water Safety Plans to get all protozoa compliance treatment systems on at-risk intakes installed by 2024 (for Minor schemes); 2025 (for Small schemes); and 2026 (for Neighbourhood schemes)	Affordability of full protozoa compliance, given the small rating base of the Hurunui and with a majority of the treated water going to stock use	Rates strike across the whole district to offset the inflation costs of these purification works starting 2015/2016. Possible application of Section 12 Rural Agricultural Drinking Guidelines for POE or POU, where water goes to more than 75% stock use.
PM 2.	Maintenance	Measure real water losses on all drinking water systems. Real water loss is losses through leaks, meter inaccuracies or water theft, but	a). Real water loss (on-demand metered supply)	maximum 20% losses	Known and recorded pumped volumes to scheme annually. Known and metered consumption volumes to scheme annually. Difference is calculated as percentage losses against total annual pumped	Incorrect recorded meter readings. Meter errors. Illegal connections. Lost volumes through pipe breaks. Unauthorised use through hydrants.	Care taken when reading and recording meter readings. Meters to have regular calibration routines. More critical pipeline condition ratings to reduce pipeline breakages outside routine

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
		excludes 'unauthorised consumption'.			volumes.		'sweated' renewals.
	Maintenance	Measure real water losses on all drinking water systems. Real water loss is losses through leaks, meter inaccuracies or water theft, but excludes 'unauthorised consumption'.	b). Real water loss (on-demand unmetered supply)	*Not yet*	Known and recorded pumped volumes to scheme annually. Unknown consumption volumes. Thus unknown real water losses to date.	High drinking water consumption by customers given no additional cost system for unreasonable usage.	Install meters to all on-demand urban drinking water supply schemes to regulate and measure water consumption, and thus be able to determine real water losses to that scheme.
	Maintenance	Measure real water losses on all drinking water systems. Real water loss is losses through leaks, meter inaccuracies or water theft, but excludes 'unauthorised consumption'.	c). Real water loss (restricted supply to tanks)	*Not yet*	Known and recorded pumped volumes to scheme annually. Unknown consumption volumes. Restricted water supply schemes have purchased units of water supplied daily through set water restrictors into private tank/reservoir, limiting the water supply quantity to the purchased amount only. However, the supply shuts off when the tank is full, thus we remain unsure of the actual water	During high demand times (peak summer), water consumed (pumped) is sometimes higher that that sold. The water restrictors are set to supply slightly more than that purchased to ensure legal quantity provided matched that purchased. Tampering with the water restrictor to gain more than purchased has been known to occur.	There is an annual rejetting programme in place to sporadically check the water restrictors for any tampering or malfunctioning. Engagement with the property owners for conservative water usage takes place in the form of public education conversations. Metered supply of water would accommodate calculated real water losses but this

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
					supplied daily.		remains very expensive and does not warrant the cost savings by doing so yet.
PM 3.	Fault median response time	Time taken by service provider in responding to the customer's call for assistance. An urgent call-out is one that leads to complete loss of water supply.	a). Urgent call-outs for fault responsiveness	2 hours	The time when the call is first received by Council (working hours)/Call Care (after-hours) is logged on the Customer Service Request (CSR). The time when a service officer arrives at the site to investigate is logged on the CSR. The time difference is calculated and taken as the fault responsiveness and captured for year-end reporting (median time taken). The officer investigating will determine the call as urgent if there is reported complete loss of water to an on-demand scheme.	The criteria for measuring urgent call-outs is based on complete water loss/supply, which would adversely affect a customer to an on-demand water supply scheme. It is assumed that all customers to restricted supply water schemes would have at least three days tank/reservoir storage, thus making any water outage on this scheme type non-urgent, with time latitude to attend to the complaint. The CSR system will need to be adjusted to capture this specifically for a year-end tallied report. Incorrect logging time of arrival on site.	The service officer will need to manually log the time of his visit for capture on the CSR if the call-out is after-hours. The reason for this is that the CSR will only be developed in NCS through the next working day available. This time must be accurately passed on to customer services to be captured on the CSR for accurate record purposes. Improvement works required to the CSR system in NCS to accommodate data capture for this year-end performance measure report.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
	Fault median response time	Time taken by service provider in remedying the customer's call for assistance. An urgent call-out is one that leads to complete loss of water supply.	b). Urgent call-outs for fault resolution	12 hours	The time when the call is first received by Council (working hours)/Call Care (after-hours) is logged on the Customer Service Request (CSR). The time when a service officer has resolved the compliant at the site (to the customer's satisfaction) is logged on the CSR. The time difference is calculated and taken as the fault resolution and captured for year-end reporting (median time taken). This will apply to all determined urgent call-out CSRs.	The time set for service completion assumes that the problem has been resolved permanently. However, if the problem reoccurs within 24 hours, then the time for service completion would need to be manually reset on the CSR for record accuracy. The CSR system will need to be adjusted to capture this specifically for a year-end tallied report.	The service officer, on dealing to an urgent call-out for a water loss/outage, would check DATRAN first to assess the cause of the breach of water supply. This would focus his remedial approach. Improvement works required to the CSR system in NCS to accommodate data capture for this year-end performance measure report.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
	Fault median response time	Time taken by service provider in responding to the customer's call for assistance. A non-urgent call-out is for all other calls excluding 'urgent' descriptor.	c). Non-urgent call-outs for fault responsiveness	72 hours	The time when the call is first received by Council (working hours)/Call Care (after-hours) is logged on the Customer Service Request (CSR). The time when a service officer arrives at the site to investigate is logged on the CSR. The time difference is calculated and taken as the fault responsiveness and captured for year-end reporting (median time taken). The officer investigating will determine the call as non-urgent if it relates to anything other than total water loss to an on-demand water scheme.	It is assumed that all customers to restricted supply water schemes would have at least three days tank/reservoir storage, thus making any water outage on this scheme type non-urgent, with time latitude to attend to the complaint. The CSR system will need to be adjusted to capture this specifically for a year-end tallied report.	The service officer will need to manually log the time of his visit for capture on the CSR if the call-out is after-hours. The reason for this is that the CSR will only be developed in NCS through the next working day available. This time must be accurately passed on to customer services to be captured on the CSR for accurate record purposes. However, if the CSR is open, then this time must be accurately captured directly to the CSR. Improvement works required to the CSR system in NCS to accommodate data capture for this year-end performance measure report.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
	Fault median response time	Time taken by service provider in remedying the customer's call for assistance. A non-urgent call-out is for all other calls excluding 'urgent' descriptor.	d). Non-urgent call-outs for fault resolution	120 hours	The time when the call is first received by Council (working hours)/Call Care (after-hours) is logged on the Customer Service Request (CSR). The time when a service officer has resolved the compliant at the site (to the customer's satisfaction) is logged on the CSR. The time difference is calculated and taken as the fault resolution and captured for year-end reporting (median time taken). This will apply to all determined non-urgent call-out CSRs.	The time set for service completion assumes that the problem has been resolved permanently. However, if the problem reoccurs within 24 hours, then the time for service completion would need to be manually reset on the CSR for record accuracy. The CSR system will need to be adjusted to capture this specifically for a year-end tallied report.	The service officer, on receiving a call-out for water loss or any other water fault, would check DATRAN first to assess the functioning operation of the water supply and provide assessment of the lead-in time period to get water up a reticulated network to restricted supplies, and thus ensure no complete water loss exceeding three days storage capability on a restricted supply scheme. This would focus his remedial approach, but would require him to visit the originator of the compliant to set the responsiveness time period. Improvement works required to the CSR system in NCS to accommodate data capture for this year-end performance measure report.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
PM 4.	Customer satisfaction	Customer complaints received by service provider about the perception of the drinking water's clarity.	a). Drinking water clarity	0	Any complaint/issue raised by a customer relating to clarity concerns in their drinking water is captured and logged in a CSR, with subsequent investigation for cause and resolution. This is tallied and reported at the end of the year as total number of complaints received relating to clarity issues in the drinking water.	The customer raising the concern must be probed for exact nature of the concern raised to log correctly for the year-end report on this performance measure	Follow up on compliant and ascertain remedial options for permanent resolution to the concern raised. Try to see if there is a trend to the concern from other customers raising issues.
	Customer satisfaction	Customer complaints received by service provider about the perception of the drinking water's taste.	b). Drinking water taste	0	Any complaint/issue raised by a customer relating to taste concerns in their drinking water is captured and logged in a CSR, with subsequent investigation for cause and resolution. This is tallied and reported at the end of the year as total number of complaints received relating to taste issues in the drinking water.	The customer raising the concern must be probed for exact nature of the concern raised to log correctly for the year-end report on this performance measure	Follow up on compliant and ascertain remedial options for permanent resolution to the concern raised. Try to see if there is a trend to the concern from other customers raising issues.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
	Customer satisfaction	Customer complaints received by service provider about the perception of the drinking water's odour.	c). Drinking water odour	0	Any complaint/issue raised by a customer relating to odour concerns in their drinking water is captured and logged in a CSR, with subsequent investigation for cause and resolution. This is tallied and reported at the end of the year as total number of complaints received relating to odour issues in the drinking water.	The customer raising the concern must be probed for exact nature of the concern raised to log correctly for the year-end report on this performance measure	Follow up on compliant and ascertain remedial options for permanent resolution to the concern raised. Try to see if there is a trend to the concern from other customers raising issues.
	Customer satisfaction	Customer complaints received by service provider about the perception of the drinking water's pressure or flow (i.e. less than the agreed Levels of Service).	d). Drinking water pressure or flow	0	Any complaint/issue logged by a customer relating to pressure/flow concerns in their drinking water is captured in a CSR, with subsequent investigation for cause and resolution. This is tallied and reported at the end of the year as total number of complaints received relating to pressure/flow issues in their drinking water.	The customer raising the concern must be probed for exact nature of the concern raised to log correctly for the year-end report on this performance measure	Follow up on compliant and ascertain remedial options for permanent resolution to the concern raised. Try to see if there is a trend to the concern from other customers raising issues.

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
	Customer satisfaction	Customer complaints received by service provider about the perception of the drinking water's continuity of supply (i.e. less than the agreed Levels of Service).	e). Continuity of drinking water supply	0	Any complaint/issue raised by a customer relating to continuity of water supply concerns for their drinking water is captured and logged in a CSR, with subsequent investigation for cause and resolution. This is tallied and reported at the end of the year as total number of complaints received relating to continuity of water supply issues for drinking water.	The customer raising the concern must be probed for exact nature of the concern raised to log correctly for the year-end report on this performance measure	Follow up on compliant and ascertain remedial options for permanent resolution to the concern raised. Try to see if there is a trend to the concern from other customers raising issues.
	Customer satisfaction	Understanding the customer's perception of the quality of the drinking water across a financial year, as provided by the service provider.	f). Issues in drinking water (a-e above) expressed per 1000 connections to the network	0	The total number of complaints received relating to clarity, taste, odour, pressure/flow, and continuity of water supply is added together for the year and divided by the total number of water rated properties (divided by 1000), rounded to the nearest whole number.	Calculation to be done correctly	

Measure No.	Key Performance Area	Description	Target issue	Target outcome	Methodology	Risks	Mitigation steps
PM 5.	Demand management	Understanding the customer's daily consumption of drinking water across all drinking water schemes provided by the service provider.	Average consumption of drinking water per day per customer within service provider's district.	285 l/p/d	The total amount of drinking water supplied across the financial year divided by the normal population (census data) divided by 365 days expressed as litres per person per day	Calculation to be done correctly. A majority of water supplied across the district is for stock purposes and the calculation does not preclude for this, thus the huge potential for results that would askew actually human consumption per day.	Could reduce the 'total amount' pumped by estimating the total stock (various) across the district and multiplying this by the respective expected consumption per day for each specie. This would remain a best-guess, but would at least bring human consumption figures more in-line with actual.

REFERENCES

Report Name	Report Produced By	Date
Hurunui Community Plan Indicators Report	Market Research,	2008
Amberley Preliminary District Plan Discussion Paper	Brent Pizzey, Senior Policy ,	30 March 2006
Water and wastewater AMP Review and Improvement Programme	Opus International Consultants Ltd.	October 2013
Population Trends and Projections	Opus International Consultants Ltd.	September 2014
Water Treatment Budget Estimates	Opus International Consultants Ltd.	October 2017

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