A LIVESTOCK EFFLUENT DISPOSAL NETWORK
26 October 2022

EXECUTIVE SUMMARY

- The ALRTA asks the Australian Government to assist in establishing a plan and funding mechanism for a national livestock transport effluent disposal network.
- The network would enable trucks to safely and legally dispose of effluent captured in transit.
- Managed disposal options would improve road safety, biosecurity, animal welfare and amenity.
- Captured livestock effluent is an environmentally friendly resource that can be used to produce green energy, composting, soil improvement or crop irrigation.
- Notably, foot-and-mouth disease is easily spread via livestock effluent. Containment of any outbreak would necessarily involve truck decontamination and effluent management.
- Establishing a disposal facility as part of an existing truck wash or saleyard costs $55k - $105k.
- Dedicated roadside facilities cost more if land acquisition and road construction is required.
- A roadside disposal network is already in operation across New Zealand.
- ALRTA has assisted in building three Australian sites via the Heavy Vehicle Safety Initiative.
- ALRTA members have identified approximately 28 priority sites.
- Staged funding options include:
  - Leveraging Australian Government contributions to National Highway programs.
  - Targeted (and non-competitive) grant funding within the Heavy Vehicle Safety and Productivity Program.
  - Cost-recovery under the PAYGO model via heavy vehicle registration and road user charges.
- Austroads guidelines for heavy vehicle rest areas already acknowledges the need to consider livestock effluent disposal facilities (section 4.5.10) in rest area design. This should be considered in any Federal Government rest area initiative.
- Roadside disposal options are strongly supported by the entire livestock supply chain.
- There may be opportunities to also improve the truck wash network as part of this initiative.
- While funding can be sourced from the transport and infrastructure portfolio, it may be appropriate for the agriculture portfolio to coordinate the initiative, including consultation with industry and road owners. Agriculture understands the need, but Infrastructure has the means.

BACKGROUND

For several years now the Australian Livestock and Rural Transporters Association (ALRTA) has raised concerns about the need to improve the Australian livestock supply chain's capacity to manage livestock effluent in transit. Although effluent collection tanks can be fitted to livestock trailers their capacity is limited and there remain logistical and environmental factors that contribute to the risk of an effluent leak or spill into the road corridor. To date, government regulation, resulting in fines for livestock drivers for load restraint breaches, has not persuaded industry stakeholders and/or governments to develop an effective solution to prevent or minimise this problem.

In 2017 ALRTA members travelled to New Zealand to research the development of New Zealand's *Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads (2003)* and to investigate its model for a publicly funded network of roadside effluent disposal facilities. The group also obtained practical guidance for construction of effluent pits and examples of different regions' processes for managing effluent collected at these roadside facilities.

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Executive Director
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E [redacted]

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Providing options for Australian heavy vehicle drivers to deposit accumulated effluent at managed disposal points, that may otherwise be spilled into the road corridor, will improve safety, amenity, the environment, and animal welfare outcomes.

ALRTA EXPERIENCE

In 2018 the ALRTA received funding from the federal government's Heavy Vehicle Safety Initiative to construct a pilot in-transit roadside effluent disposal facility on the Warrego Highway in south east Queensland. However, state government support for the project was eventually withdrawn during the site identification stage of the project planning process.

ALRTA then moved to partner with saleyard facilities, managed by local governments, to construct effluent disposal facilities on sites at Horsham, Mount Gambier and Warrnambool that could be used as destination facilities or, due to their close proximity to key livestock routes, used as in-transit facilities.

Basic requirements

An ideal livestock effluent disposal facility requires:

- a site located on or as close as practicable to a major livestock route, suitable for in-transit usage, minimising delay for trucks using the facility, at a strategic location that intercepts livestock trucks before they reach spillage problem areas, having consideration for sharp bends, steep hill sections and proximity to urban development.
- a local plan for the operation, monitoring and maintenance of the facility; and
- a site specific plan for the treatment and/or usage of collected effluent

Selecting suitable sites

Factors to consider in selecting a potential site for an in-transit effluent disposal facility include:

- appropriate heavy vehicle access
- current and future land use in the vicinity and any potential impacts on the environment
- land use consent
- suitability of effluent capture systems and availability of effluent treatment options

Note: It is important to consult with the end users of the site.

Design and construction of livestock effluent disposal facilities

Design features of a good quality livestock effluent disposal facility:

- The approach to a livestock effluent disposal facility should be reasonably flat to provide the best visibility for the driver.
- Typically, the design of an effluent disposal facility should provide for two grated receptor units to accommodate a standard B-double configuration and allow for both holding tanks to be emptied at once.
- A smooth hard stand area (hot mix or concrete).
- The structure strength must be able to carry the weight of a fully loaded B-double truck.
- Efficient drainage – using a natural gravity fall.

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Ph: [redacted]
E: [redacted]

- Ideally, provision of water to wash down the receptor areas and handwashing facilities for users.
- Lighting to enable safe 24/7 usage.
- Signage and/or Avdata key access - to restrict facility usage to livestock transporters and exclude potential for contamination (if used by RV drivers and others).
- An effluent discharge system
- A volume monitoring system for a pump-out disposal option.

Saleyard structures may also include:

- A concrete shoulder to stop overflow escape
- Splash walls
- An automatic water flushing system in the transfer piping to minimise blockages
-

Livestock effluent disposal pit at Mount Gambier Saleyards SA – a project delivered by District Council of Grant

NOTE: See construction plans at Attachment A, B and C.

EXAMPLE COSTINGS

Saleyard facilities

1. **Horsham saleyard (HRLE) quoted in 2019 – constructed in 2020.**

ALRTA contributed $54,525 ex GST to this project.

Mathew Munro **Ph:** [redacted]
Executive Director **E:** [redacted]

A LIVESTOCK EFFLUENT DISPOSAL NETWORK
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Item	Cost
Design	1,500
Earth work for sloped pit	6,060
Machines: crane/forklift/concrete pump/vibrator	3,000
Reinforced steel fabrication	3,900
Shoring hire 2 weeks	3,000
Concrete material 13 cubic metres	4,940
Steel cages and grid prefab	7,000
Contractor for concreting and steel fixing	13,200
Water pump and fittings	1,500
Splashguards, handrails, bollards, hand wash facility	9,625
Line marking	800
Total cost ex GST	**$54,525**

2. Mount Gambier saleyard - completed in 2021

ALRTA contributed $50,00 ex GST to this project. The balance was funded by District Council of Grant:

The accepted quote for $103,000 included:

- Excavations
- Placement of pre-cast pits
- Drainage
- Plastic reo for concrete supply for lay
- Water points at pits with retractable hoses
- Button operated flushing system with timer
- 30 x 3 metre concrete hard stand with shoulder
- Mains power lighting

3. Warrnambool saleyard (SWVLE) - constructed in 2022

ALRTA agreed to fund $50,00 ex GST to this project, with any outstanding amount funded by council.

Item	Cost
Site set up	2,000
Concrete hard stand	18,972
Kerbing	5,720
Pit excavation	5,520
Pit lids (grates)	6,600
Pit installation x 2	9,600
Reticulated water	2,400
Connection to sewer	2,928
Project management (council in- kind)	5,078
Total cost ex GST	**$58,818**

Note: Saleyard locations have pre-existing effluent treatment systems on site.

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E: [redacted]

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Roadside facilities

There are additional costs for a roadside livestock effluent disposal facility.

As noted earlier, livestock effluent disposal facilities require appropriate heavy vehicle access. On a major freight route, where the speed limit is likely to be 100km/h, construction of appropriate access and egress lanes may be required. The cost of construction of the deceleration and acceleration lanes may be 1 million dollars in greenfield sites and could be much more, depending on the specific site and whether it is constructed within the existing road corridor or whether additional land acquisition is necessary.

Also, on busy livestock routes it may be advisable to have a facility located on either side of the road, doubling the cost of construction, but minimising the risk of a livestock truck turning across lanes on a busy highway to access a facility. Alternatively, road managers may choose to construct a right turn bay or install infrastructure to restrict such movements.

Thirdly, a local effluent holding or treatment system would need to be established for each site. A number of options have been successfully implemented in New Zealand including:

- Holding tanks are monitored and regularly pumped out with the effluent processed off site
- Pumping to adjacent to local sewerage systems
- Irrigation systems
- Oxidation pond based treatment systems (a dairy or worm farm may be a suitable recipient)
- Combination – a pond based treatment system that feeds into sewerage systems.

An example of a roadside effluent disposal facility in the Waikato region of New Zealand

Mathew Munro **Ph:** [redacted]
Executive Director **E:** [redacted]

A LIVESTOCK EFFLUENT DISPOSAL NETWORK
26 October 2022

PRIORITY SITES

ALRTA has consulted members on a number of occasions to develop a priority list of sites for construction of roadside livestock effluent disposal facilities.

In an ideal world there would be a livestock effluent disposal facility on key livestock routes within 200kms of destinations such as feedlots, saleyards and abattoirs and on the outskirts of major urban development.

The list below is based on operator experience of livestock truck traffic in key transport corridors and known effluent "hot spots".

Victoria

1. Gippsland side of Melbourne
2. Beveridge – Hume Highway
3. Lara / Werribee / Avalon

Note: The priority for effluent disposal sites is in the greater Melbourne area.

New South Wales

1. Moonbi – A15 New England Highway
2. Forbes – A39 Newell Highway
3. Goulburn – M31 Hume Highway,
4. Wallangarra – A15 New England Highway
5. Narrabri – Intersection of A39 Newell & B51 Kamilaroi Highway
6. Tweed Heads – M1 Pacific Highway

Queensland

1. Charlton – Warrego Highway & Gore Highway (TSRC Toowoomba Second Range Crossing) or between Toowoomba and Blacksoil
2. Yarraman – D'Aguilar Highway between Yarraman and Brisbane Valley Highway turn off near Colinton
3. Kingaroy Area to service the bacon abattoirs
4. WDRC Western Downs Regional Council area
5. Ipswich /Logan Motorway
6. Gracemere/Rockhampton – A4 Capricorn Highway - *The Rockhampton ring road will soon start construction bypassing North Queensland Bruce highway traffic around the City – This will put the spotlight on livestock trucks going through the CBD with reduced general traffic.
7. Sunshine Coast area somewhere north of Caboolture. The Bruce Highway - sees plenty of trucks transit through the area to head south via the M1 to NSW etc.

Western Australia

1. Picton area (south)
2. Forrestdale / Medina (central)
3. Muchea (north)

Note: WA is also desperately short of truck wash facilities (which could host effluent disposal as well).

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A LIVESTOCK EFFLUENT DISPOSAL NETWORK
26 October 2022

South Australia

1. Dublin saleyards - A1 Princes Highway/Port Wakefield Highway
2. Keith – A8 Western Highway
3. Truro – A20 Sturt Highway

Tasmania

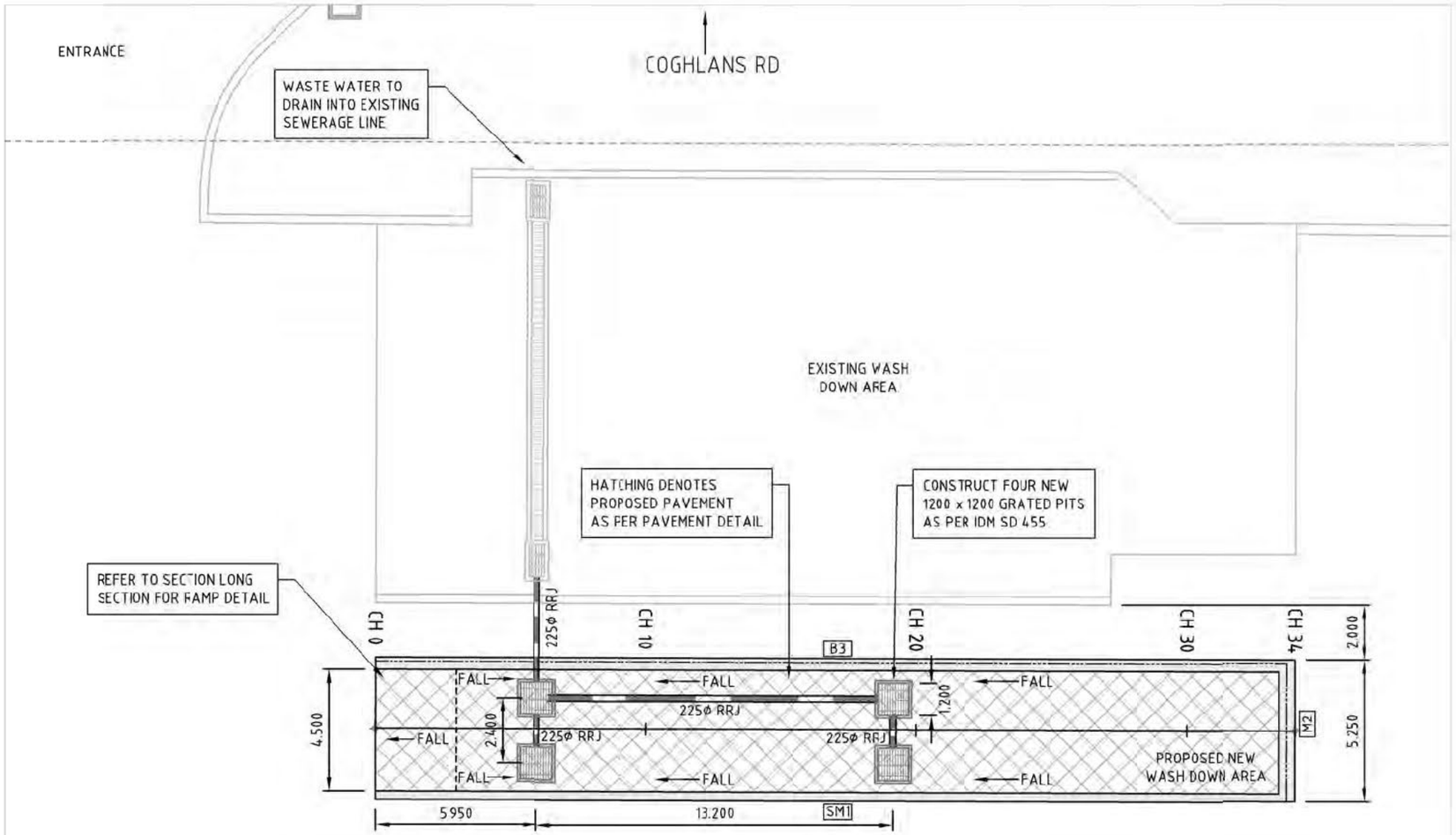
in the North West –

- Burnie
- Smithton
- Stanley
- King Island

Note: All of the above are within the scope of a $4m project announced in 2019.

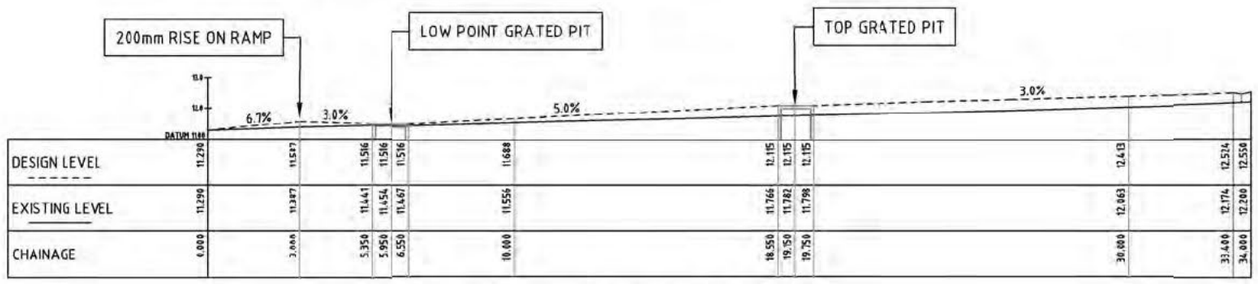
- in the North East – Scottsdale / Bridport areas have been discussed and preferred
- in the South – Oatlands is the preferred location.

Mathew Munro **Ph:** [redacted]
Executive Director **E:** [redacted]



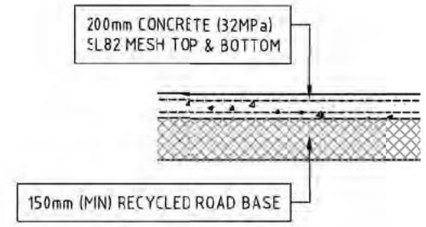
SALEYARDS PROPOSED WASH DOWN BAY

SCALE = 1:200



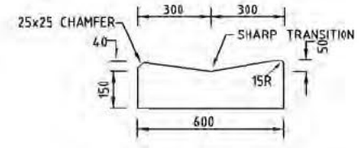
WASH DOWN BAY LONG SECTION

SCALES = HORIZONTAL 1:100 VERTICAL 1:100

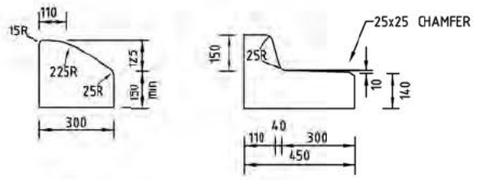


PAVEMENT DETAIL

SCALE = 1:50



M2



SM1 B3

KERB AND CHANNEL DETAILS

SCALE = NTS

NORTH

WARNING

BEWARE OF UNDERGROUND SERVICES

THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY, AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

REV	DESCRIPTION	DATE
A	LAYOUT PLAN	21/01/22

WARRNAMBOOL CITY COUNCIL

DRAWN: [redacted]	DATE: 21/01/22	PROJECT: SALEYARDS TRUCK WASH DOWN BAY	
CHECKED: [redacted]	DATE: ../../..		
SCALE: A3 1 : 200	DATE: JANUARY 2022	DRAWING TITLE: LAYOUT	
CAD FILE: o:\city infrastructure\technical services\projects\21.22\pro2122022 saleyards washdown bay\cad\saleyards washdown bay.dwg		PROJECT No. PRO2022022	SHEET No. 1 OF 1 / REV: A

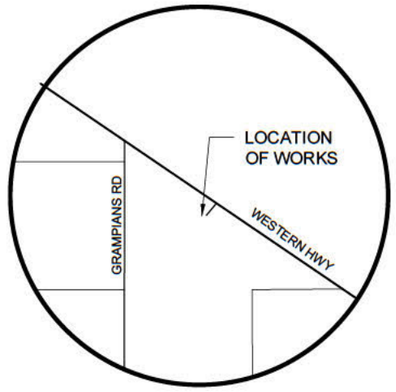
HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT

68 Burnt Creek Drive
Bungalally, VIC 3401

DRAWING INDEX

STRUCTURAL DRAWINGS

DRAWING NO.	TITLE
S01	DRAWING INDEX & LOCALITY PLAN
S02	GENERAL NOTES - SHEET 1
S03	GENERAL NOTES - SHEET 2
S04	GENERAL PLAN AND SECTIONS
S05	PIT REINFORCEMENT DETAILS (1)
S06	PIT REINFORCEMENT DETAILS (2)



LOCALITY PLAN
NTS

PO Box 026
Horsham, VIC 3402
m. 0411 210 161
w. www.structconsulting.com.au

STRUCT CONSULTING

REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	JAN. 2019
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: DRAWING INDEX AND LOCALITY PLAN

ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWING NO:	REVISION:
19915	1:100 at A3	S01	C1

GENERAL NOTES:

G1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION, ARCHITECTURAL, LANDSCAPE DRAWINGS AND OTHER ENGINEERING DRAWINGS.
G2. ALL DISCREPANCIES BETWEEN DRAWINGS SHALL BE REPORTED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
G3. DIMENSIONS AND LEVELS SHALL BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS AND SHALL BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORKS OR FABRICATION.
G4. DO NOT SCALE DRAWINGS.
G5. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE RELEVANT AUSTRALIAN STANDARDS AND THE BUILDING CODE OF AUSTRALIA.
G6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
G7. THE DESIGN IS BASED ON THE FOLLOWING DESIGN STANDARDS:
AS/NZS 1170.(Pt 0 TO 4) - STRUCTURAL DESIGN ACTION (DEAD AND LIVE LOADS).
AS1170 (Pt 1 TO 4) - MINIMUM DESIGN LOADS ON STRUCTURES
AS1684 (Pt 2 TO 4) - RESIDENTIAL TIMBER FRAMED CONSTRUCTION
AS1720 - T MBER STRUCTURES
AS2870 - RESIDENTIAL SLABS & FOOTINGS
AS3600 - CONCRETE STRUCTURES
AS3700 - MASONRY STRUCTURES
AS4055 - WIND LOADS FOR HOUSING
AS4100 - STEEL STRUCTURES
G8. DURING CONSTRUCTION, ALL PARTS OF THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART OF THE STRUCTURE SHALL BE OVERSTRESSED AS A RESULT OF THE CONSTRUCTION PROCEDURES OR THE APPLIED CONSTRUCTION LOADS. THE CONTRACTOR SHALL PROVIDE COMPUTATIONS TO JUSTIFY THE ADEQUACY OF THE STRUCTURE TO SAFELY WITHSTAND ANY IMPOSED LOADS AND/OR CONSTRUCTION PROCEDURES AND ALLOW FOR COSTS ASSOCIATED WITH ANY TEMPORARY WORKS REQUIRED. IN PARTICULAR ALL PANELS SHALL BE CLAMPED AND PROPPED DURING CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER.
G9. THE BUILDER SHALL GIVE AT LEAST 48 HOURS NOTICE PRIOR TO INSPECTION OF ALL STRUCTURAL WORKS.
G10. BUILDER TO ALLOW IN HIS TENDER FOR ALL ADDITIONAL COST ASSOCIATED WITH THE PROPOSED LOCATION OF CRANE(S) AND RELATED SUPPORT STRUCTURES.
G11. SUBSTITUTION SHALL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.
G12. PROVIDE 10mm ABLEFLEX OR APPROVED EQUIVALENT AROUND COLUMNS, EDGE THICKENINGS & EXTERNAL PAVEMENTS. PROVIDE CAULKING AS REQUIRED.
G13. WIND CATEGORY: N2 AS PER AS4055 - 2012.

IMPORTANCE LEVEL:	NA
TERRAIN CATEGORY:	NA
SITE WIND SPEED:	NA

FOUNDATION NOTES:

F1. THE MINIMUM SAFE BEARING CAPACITY OF THE FOUNDATION MATERIAL IS TO BE AS FOLLOWS:
REFER TO PROJECT MEMBER SCHEDULES
F2. ALL FOUNDATION WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE FOLLOWING GEOTECHINCAL (SOIL) REPORT:

REPORT No.:	181396
AUTHOR:	LR PARDO & ASSOCIATES PTY LTD
DATE:	18 DECEMBER 2019

REFER TO SOIL REPORT FOR SITE PREPARATION & EARTHWORKS REQUIREMENTS

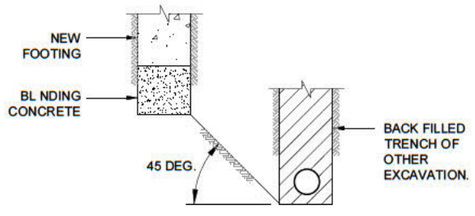
F3. SLAB DESIGN BASED ON THE FOLLOWING PARAMETERS TO AS2870 - 2011.

SITE CLASS:	P

F4. OVER-EXCAVATION WITHIN THE INFLUENCE ZONE OF ANY ADJOINING FOOTINGS (45 DEGREES LINE DOWN FROM THE EXTERNAL BOTTOM CORNER OF EXISTING FOOTINGS) IS NOT ALLOWED WITHOUT THE EXPRESSED APPROVAL OF THE ENGINEER.

FOUNDATION NOTES (CONTINUED):

F5. FOUNDATIONS AND EARTHWORKS FOR BUILDINGS AND STRUCTURES SHALL COMPLY WITH THE SPECIFICATION, LATEST EDITIONS OF THE RELEVANT AUSTRALIAN STANDARDS AND THE BCA. ALL EXCAVATION SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF REINFORCEMENT OR BLINDING.
F6. THE CONTRACTOR SHALL CERTIFY TO THE ENGINEER THAT HE HAS OBTAINED THE APPROVED BEARING CAPACITY BEFORE INSPECTIONS A MINIMUM OF 48 HOURS NOTICE IS REQUIRED FOR AN INSPECTION.
F7. ANY OVER EXCAVATION UNDER PROPOSED FOOTINGS SHALL BE FILLED UP TO LEVEL WITH BLINDING CONCRETE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL ALLOW FOR ALL OVER EXCAVATIONS TO FOUNDATIONS DUE TO HIS CONSTRUCTION TECHNIQUES AND FROM ACCESS TO SITE AND WEATHER CONDITIONS.
F8. EXCAVATIONS SHALL BE CARRIED OUT IN DRY CONDITIONS. WATER ENTERING AN EXCAVATION SHALL BE REMOVED AND ANY RESULTING SLUDGE SCRAPPED FROM THE BASE IN ORDER TO RESTORE A FIRM BEARING SURFACE.
F9. ALL WALLS AND COLUMNS SHALL BE CONCENTRIC WITH SUPPORTING FOUNDATIONS UNLESS OTHERWISE NOTED ON DRAWINGS.
F10. SUBGRADE PREPARATION AND BACKFILLING OF TRENCHES UNDER CONCRETE SLABS ON GROUND AND STIFFENED RAFTS SHALL BE AS IN SPECIFICATION. ALL PIPEWORK TRENCHES UNDER GROUND SLABS SHALL BE BACKFILLED WITH 5% STABILISED SANDS UNLESS APPROVED OTHERWISE BY ENGINEER. BUILDER TO ALLOW FOR ADDITIONAL REINFORCEMENT TO GROUND SLABS OVER ALL SERVICES TRENCHES (ie. HYDRAULIC, DRAINAGE, MECHANICAL, ELECTRICAL ETC.)
F11. GROUND SLABS SHALL BE POURED ON A 0.2mm THICK CONTINUOUS POLYTHENE MEMBRANE U.N.O. ALL JOINTS SHALL BE LAPPED AND FULLY TAPED. THE MEMBRANE SHALL BE PLACED ON A 50mm LAYER OF COMPACTED SAND (U.N.O.) OVERLYING SUBGRADE MATERIAL WITH A MIMIMUM SAFE BEARING PRESSURE OF 50kPa. THE EXPOSED SUBGRADE SHALL BE COMPACTED TO A MINIMUM DRY DENSITY RATION OF 95% OF STANDARD COMPACTION DETERMINED IN ACCORDANCE WITH AS1289 E4.1. ANY OVER EXCAVATION OR FILL AREA SHALL BE BROUGHT UP TO LEVELS IN LAYERS WITH A MAXIMUM LOOSE THICKNESS OF 150mm WITH APPROVED GRANULAR MATERIAL COMPACTED TO A MINIMUM DRY DENSITY RATIO OF 98% OF STANDARD-COMPACTION DETERMINED IN ACCORDANCE WITH AS1289 E4.1.
F12. LOOSE FILL IF REQUIRED FOR SUSPENDED SLABS SHALL BE SUFFICIENT TO SUPPORT CONSTRUCTION OF SLABS IN A STABLE CONDITION AND TO ENSURE THAT NO MOVEMENT WILL OCCUR DURING THE CURING PROCESS.
F13. ALL RETENTION WORKS ARE TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL ENGINEER'S REPORT AND STRUCTURAL DRAWINGS. ANY VARIATION IS TO BE REFERRED TO THE ENGINEER FOR APPROVAL AT THE EXPENSE OF THE CONTRACTOR.
F14. THE CONTRACTOR SHALL UNDERTAKE TESTING TO ENSURE APPROPRIATE COMPACTION OF PLACED FILL. THE FREQUENCY OF TESTING SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE GUIDELINES PRESENTED IN SECTION 8 OF AS3789 2007. UNLESS NOTED OTHERWISE FILL SHOULD BE PLACED IN LAYERS NOT EXCEEDING 300mm LOOSE THICKNESS.
F15. WHERE A NEW FOOTING IS TO BE LOCATED CLOSE TO EXISTING FOOTING, EXISTING OR NEW SERVICE, AN EXCAVATION OR BATTER THE FOUNDING DEPTH FOR THE NEW FOOTING SHALL BE DEEPENED TO BELOW ANGLE OF REPOSE. PROVIDE BLINDING CONCRETE WHERE NECESSARY AS BELOW:



FOUNDATION MAINTENANCE NOTES:

FM1. APPROPRIATE DRAINAGE AROUND CONCRETE FOOTINGS SHALL BE INSTALLED TO PREVENT DAMAGE TO THE FOOTINGS DUE TO GROUND MOVEMENTS
FM2. THE EFFECT OF TREES, POOR SURFACE DRAINAGE AND/OR LEAKING PLUMBING MAY LEAD TO VOLUME CHANGES AND MOVEMENT OF THE SOIL, WHICH CAN RESULT IN STRUCTURAL DAMAGE TO THE FOOTINGS.
FM3. PLEASE REFER TO "FOUNDATION MAINTENANCE AND FOOTING PERFORMANCE: A HOMEOWNERS GUIDE" PREPARED BY CSIRO FOR MAINTENANCE AND PLANNING OF LANDSCAPING. THE OWNER SHALL TAKE THE FOLLOWING MAIN ITEMS INTO ACCOUNT:
DO NOT OVERWATER THE GROUND NEAR YOUR HOUSE,
DO NOT BUILD UP THE GROUND AROUND YOUR HOUSE,
DO NOT ALLOW SURFACE WATER TO RUN TOWARDS YOUR HOUSE
FM4. DRAINAGE WORKS SHOULD BE COMPLETED AS SOON AS POSSIBLE AFTER FOUNDATION CONSTRUCTION TO ENSURE THAT NO PONDING OF WATER OCCURS OR MOISTURE RETENTION IS ALLOWED WITHIN 5M OF THE BUILDING BOUNDARY
FM5. LANDSCAPING SHOULD PROVIDE A SOLID SURFACE FOR 1M AROUND THE FOUNDATION WHERE POSSIBLE (EG. CONCRETE/PAVED PATH AROUND BUILDING) AND REMAINING LAWN/GARDEN BEDS SHOULD GRADE AWAY FROM THE BUILDING IN ALL DIRECTIONS. AVOID PLANTING LARGE TREES IN PROXIMITY TO THE FOUNDATION.

TREE REMOVAL NOTES:

TR1. IF ANY MAJOR VEGETATION AND TREE REMOVAL IS TO OCCUR ON THE SITE, IT IS RECOMMENDED THAT REMOVAL OCCUR APPROXIMATELY 1 YEAR PRIOR TO DEVELOPING THE SITE TO ALLOW THE NATURAL GROUND MOISTURE CONDITIONS TO REACH EQUILIBRIUM. FAILURE TO DO SO MAY RESULT IN EXCESSIVE MOVEMENT OF THE STRUCTURE.
TR2. THE LOCAL AUTHORITY SHOULD BE CONTACTED IN REGARDS TO ANY PERMITS REQUIRED FOR THE REMOVAL OF VEGETATION.

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STRUCT CONSULTING

REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	JAN. 2020
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: GENERAL NOTES - SHEET 1

ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWNG NO:	REVISION:
19915	1:100 at A3	S02	C1

CONCRETE NOTES:

C1. ALL CONCRETE WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH AS2870 & AS3600.

C2. UNLESS NOTED OTHERWISE ON DRAWINGS, CONCRETE PROPERTIES SHALL BE AS FOLLOWS:

ELEMENT GRADE (MPa)
REFER TO PROJECT MEMBER SCHEDULES

CONCRETE SLUMP AT AN AGREED POINT ON THE CONSTRUCTION SITE SHALL BE BETWEEN 80mm AND 100mm UNLESS NOTED OTHERWISE. THE MAXIMUM NOMINAL AGGREGATE SIZE SHALL BE 20mm.

COVER (MILLIMETRES) TO ALL REINFORCEMENT INCLUDING FITMENTS (EXCLUDING FINISHES) SHALL BE AS INDICATED IN TABLE BELOW UNLESS NOTED OTHERWISE IN THIS DRAWING PACKAGE:

ELEMENT	TOP	BOTTOM	SIDES
FOOTINGS	50	50	50
GROUND BEAMS	40	40	50
INTERNAL SLABS	25	30	25
EXTERNAL SLABS	40	40	40

TOLERANCES TO FORMWORK AND CONCRETE SHALL BE IN ACCORDANCE WITH CLAUSE 4.4.2 OF AS1509-1974, UNLESS NOTED OTHERWISE.

THE FOLLOWING CONCRETE EXPOSURE CLASSIFICATIONS FOR DURABILITY WERE USED IN THE DESIGN:

ELEMENT	EXPOSURE
IN CONTACT WITH THE GROUND	A2
EXTERIOR	B1
INTERIOR	A1

C3. ALL REINFORCEMENT SHALL BE SUPPORTED IN POSITION BY APPROVED CHAIRS, SPACERS OR TIES. IN SLABS THE BAR CHAIRS SHALL BE AT 800 x 800mm MAXIMUM CENTRES. BAR CHAIRS SHALL BE PROVIDED ALONG EDGES OF ALL CONSTRUCTION JOINTS. STOP ENDS SHALL NOT BE USED TO MAINTAIN COVERS. FOR ALL EXTERNAL SURFACES PROVIDE FULLY PLASTIC BAR CHAIRS. TIE WIRE SHALL NOT BE NAILED TO THE FORMS, REINFORCING BARS SHALL NOT BE USED TO KEEP FORMS APART AND A THROUGH TIE SYSTEM SHALL BE USED TO TIE FORMS.

C10. THE CONTRACTOR SHALL GIVE THE ENGINEER 48 HOURS NOTICE TO INSPECT REINFORCEMENT PRIOR TO PLACEMENT OF CONCRETE.

C11. CONCRETE SHALL BE HANDLED AND PLACED IN ACCORDANCE WITH SECTION19 OF AS3600.

C12. CONCRETE SIZES SHOWN ON THESE DRAWINGS ARE MINIMUM STRUCTURAL SIZES AND DO NOT INCLUDE APPLIED FINISHES.

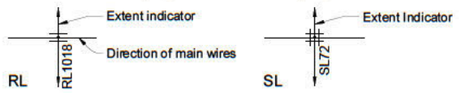
C13. PENETRATIONS FOR MECHANICAL, ELECTRICAL, HYDRAULICS AND OTHER SERVICES WHICH ARE NOT SHOWN ON THESE DRAWINGS SHALL BE REFERRED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

REINFORCEMENT NOTES:

R1. STEEL REINFORCEMENT SHALL BE TO AS/NZS4671.

R2. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION. REFER TO NOTES AND SCHEDULE FOR SPECIFIC REINFORCING REQUIREMENTS.

R3. REINFORCEMENT IS DENOTED BY A SYMBOL IN ACCORDANCE WITH AS4671 FOR BARS AND MESH.
REINFORCEMENT NOTATION:

R	DENOTES 250R STRUCTURAL GRADE ROUNDS TO AS4671
C	DENOTES 410C COLD WORKED BARS TO AS4671
N	DENOTES 500N 'NORMAL' DUCTILITY DEFORMED BARS TO AS4671
RL & SL	DENOTES 'LOW DUCTILITY' WIRE MESH TO AS4671 RECTANGULAR MESH (RL), SQUARE MESH (SL) SHOWN THUS ON PLANS: 

R4. ALL BARS SHALL BE LAPPED IN ACCORDANCE WITH AS3600.

R5. TOP REINFORCEMENT IN EDGE OF SLABS OR BEAMS SHALL HAVE STANDARD COGS IN ACCORDANCE WITH SECTION 13.1.2.6 OF AS3600. BOTTOM REINFORCEMENT IN SLABS OR BEAMS SHALL ANCHOR INTO THE SUPPORT IN ACCORDANCE WITH SECTION 13.1.2.6 OF AS3600.

STRUCTURAL BOLT NOTES:

B1. BOLTS SHALL BE GRADE 8.8 HIGH STRENGTH STRUCTURAL BOLTS (UNLESS NOTED OTHERWISE), NUTS AND WASHERS TO AS/NZ1252 INSTALLED IN ACCORDANCE WITH AS4100, AS5100.6 AND AS3990.
- S : SNUG TIGHT
- TB : BEARING MODE JOINT, BOLTS FULLY TENSIONED
- TF : FRICTION MODE JOINT, BOLTS FULLY TENSIONED

B2. ALL BOLTS, NUTS AND WASHERS TO BE GALVANIZED TO AS1214 UNLESS NOTED OTHERWISE.

B3. SNUG TIGHTENING AND FINAL TENSIONING OF BOLTS SHALL PROCEED FROM THE STIFFEST PART OF THE CONNECTION TOWARDS THE FREE EDGES.

B4. ALL THE BOLTS AND NUTS SHALL BE QUALITY CONTROLLED AS PER RELEVANT AUSTRALIAN STANDARDS OR HAVE APPROPRIATE CERTIFICATION FROM APPROVED ORGANISATIONS.

B5. ALL POST-FIXED BOLTS OR ANCHORS ARE TO BE INSTALLED USING SUITABLE EPOXIES FROM HILTI OR RAMSET AND INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

STRUCTURAL STEELWORK NOTES:

S1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS4100, AS5100 AND THE PROJECT SPECIFICATION.

S2. STEELWORK TOLERANCE SHALL BE IN ACCORDANCE WITH AS5100, AS4100 AND ALL OTHER RELEVANT AUSTRALIAN STANDARDS U.N.O.

S3 STRUCTURAL STEEL SHALL BE PROVIDED AS FOLLOWS UNLESS NOTED OTHERWISE:
- PLATES - AS3678 GRADE 350 L 15
- WC, UB, UC, RHS & SHS - AS/NZS3679.1 GRADE 300.

S4. WELDING SHALL BE PERFORMED BY AN EXPERIENCED OPERATOR IN ACCORDANCE WITH AS1554-5 - 2004.
- ALL INTERFACES BETWEEN STEEL SECTIONS TO BE CONNECTED WITH 6 CFW ALL AROUND BOTH SIDES, U.N.O.
WELDS TO BE SHOP WELDED U.N.O.
- BUTT WELDS TO BE FULL (COMPLETE) PENETRATION (DESIGNATED FSBW ON DRAWINGS), U.N.O.
- WELDING ELECTRODES SHALL BE E48XX UNO AND WELDS TO BE CATEGORY SP U.N.O.
- WELDING SYMBOLS ARE IN ACCORDANCE WITH AS101.3.

S5. ENSURE MEMBERS ARE CONCENTRIC AT CONNECTIONS (GRAVITY OR GAUGE LINE TO INTERSECT) U.N.O.

S6. PRE-DRILLED AND PRE-PLANED PACKER PLATE ARE TO BE FITTED TO THE STEELWORK CONNECTIONS TO ENSURE A CONNECTION FIT TOLERANCE OF 0.5mm IS ACHIEVED.

S7. THE CONTRACTOR SHALL PROVIDE AND LEAVE IN PLACE TEMPORARY BRACING UNTIL PERMANENT BRACING ELEMENTS ARE CONSTRUCTED. SUCH TEMPORARY BRACING AS IS NECESSARY TO STABILISE THE STRUCTURE DURING ERECTION.

S8. THE CONTRACTOR SHALL SUBMIT COPIES OF THE SHOP DRAWINGS TO THE SUPERINTENDENT FOR REVIEW THREE WEEKS PRIOR TO FABRICATION. REVIEW DOES NOT INCLUDE CHECKING OF DIMENSIONS.

S9. ALL PERMANENTLY EXPOSED MEMBERS SHALL BE:

1. GALVANIZED WITH THE FOLLOWING COATING RATES :-

COMPONENT	MIN MUM AVERAGE COATING
STEEL 5mm THICK AND OVER	600g/m2
STEEL 2mm TO 5mm THICK	450g/m2

2. ANY DAMAGED GALVANIZED COATINGS SHALL BE COLD GALVANISED USING 'COLD GAL' OR APPROVED EQUIVALENT.

S10. STRUCTURAL STEEL WELDING QUALITY TO CONFORM TO AS1554.5.

S11. PROVIDE DRAIN HOLES TO ALL STEELWORK TO ENABLE SUFFICIENT GALVANISING.

S12. HOT-DIPPED GALVANISING TO BE IN ACCORDANCE WITH AS.NZS4680-2006.

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REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

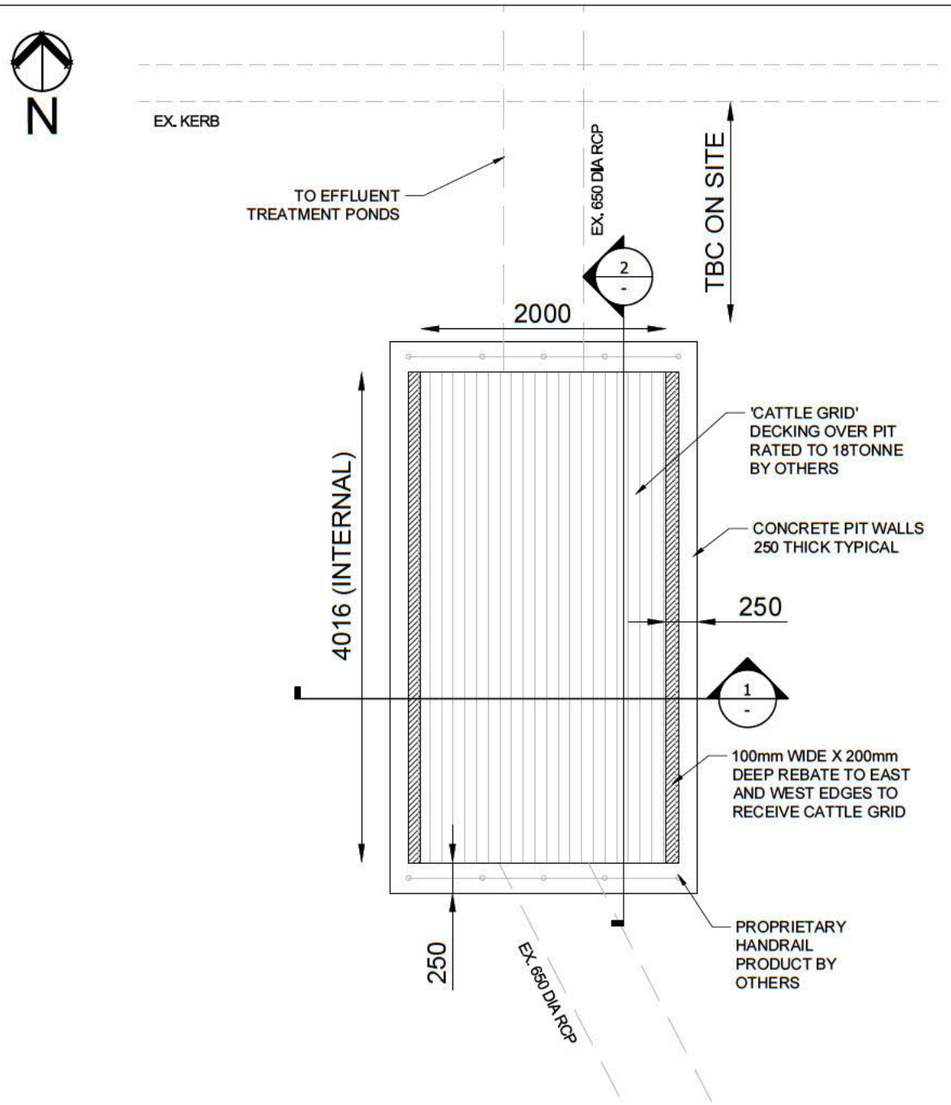
DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	JAN. 2020
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: GENERAL NOTES - SHEET 2

ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWING NO:	REVISION:
19915	1:100 at A3	S03	C1



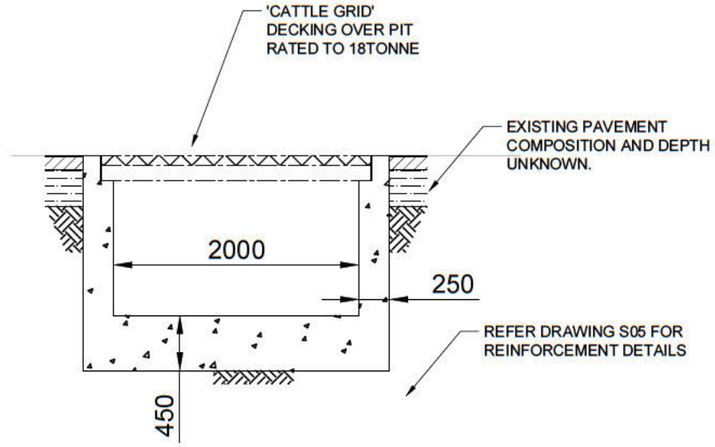
GENERAL ARRANGEMENT PLAN

SCALE 1:50

NOTES:
1. PIT TO BE FOUNDED IN NATURALLY OCCURRING COMPACTED SANDY CLAY MATERIAL WITH MINIMUM 100kPa ALLOWABLE BEARING CAPACITY
2. PIT DESIGNED FOR FULLY LOADED B-DOUBLE TRUCKS:
   MAXIMUM 16.5T TANDEM AXLE GROUP OR 20T TRIAXLE GROUP (BOTH VERTICALLY AND AS A HORIZONTAL SURCHARGE LOAD)
3. EQUIVALENT SURCHARGE LOAD IN EXCESS OF 25kPa

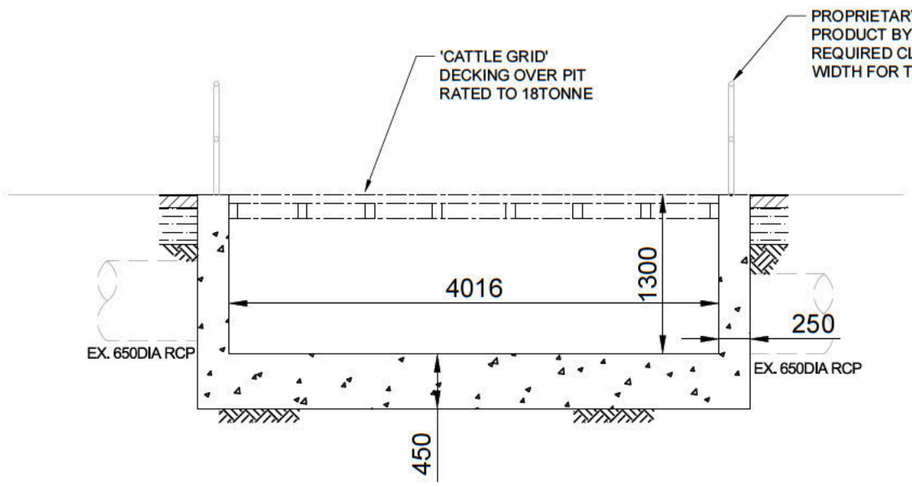
CONCRETE PIT DESIGN NOTES:

1. REINFORCED CONCRETE TRUCK WASH PIT INTERNAL DIMENSIONS TO BE NOMINALLY 4000L x 2000W x 1300D (DIMENSIONS DETERMINED BY OTHERS)
2. WALLS TO BE 250mm THICK
3. BASE TO BE 450mm THICK
4. CONCRETE TO BE MINIMUM N40 GRADE WITH PENETRON/XYPEX WATERPROOFING ADDITIVE AND HYDROTITE AT CONSTRUCTION JOINTS
5. COVER TO REINFORCEMENT TO BE 50mm
6. WALL REINFORCEMENT:
   N16-200 VERTICAL, N12-200 HORIZONTAL EACH FACE
7. BASE REINFORCEMENT:
   N16-200 EACH WAY, EACH FACE
8. DAMP PROOF MEMBRANE TO BE INSTALLED TO ALL FACES ADJACENT TO EARTH/ROAD BASE



1 TYPICAL SECTION THROUGH PIT

SCALE 1:50



2 LONG SECTION THROUGH PIT

SCALE 1:50

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REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL
P1	12.12.2019	ISSUED FOR REVIEW	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

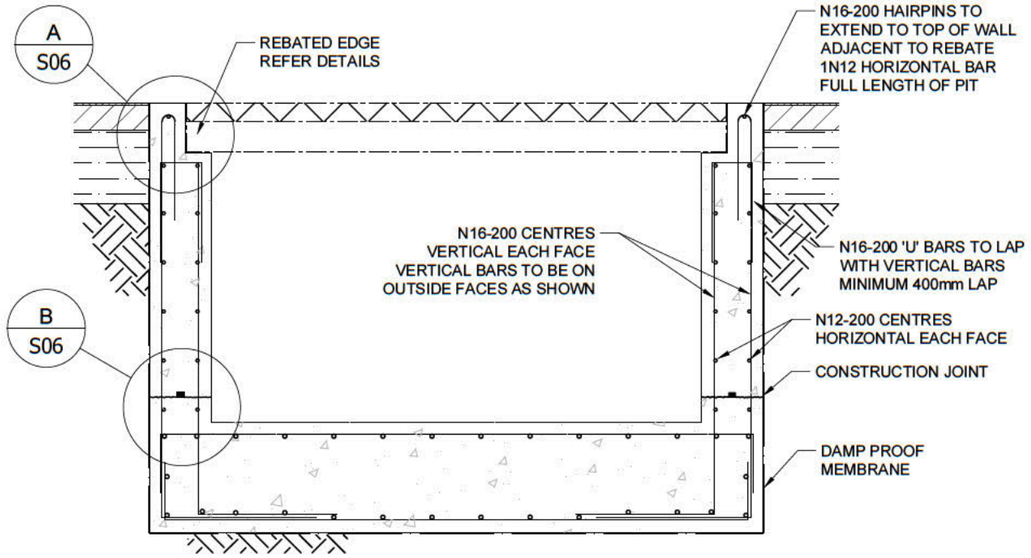
DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	DEC. 2019
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: TRUCK WASH OUT PIT GENERAL PLAN AND SECTIONS

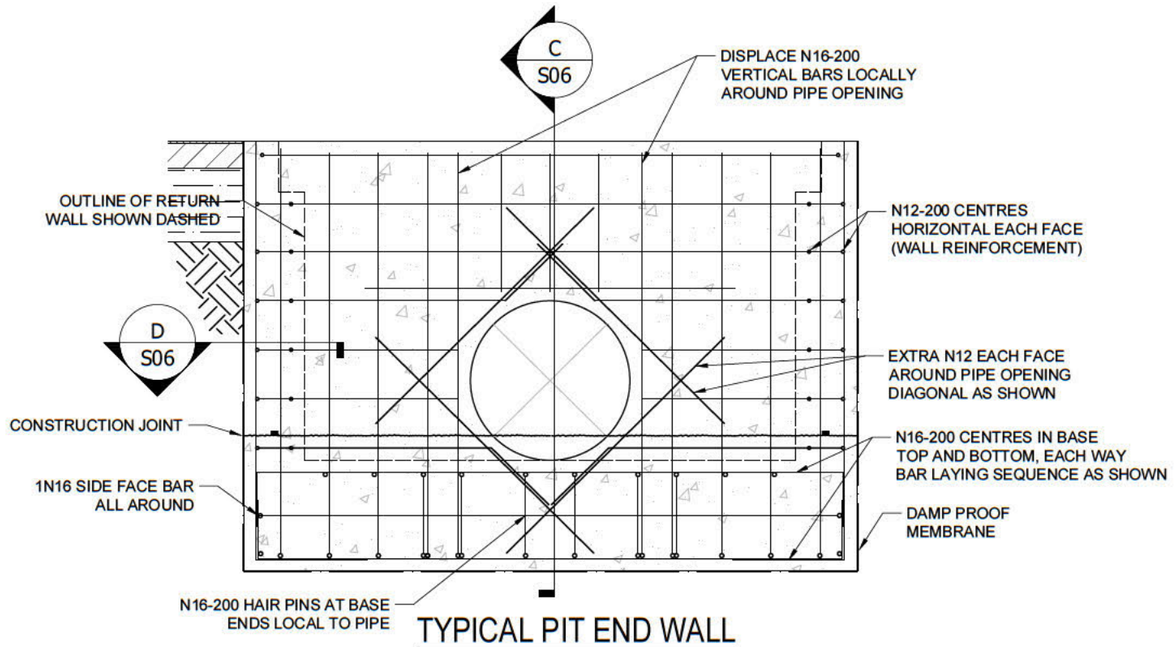
ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWING NO:	REVISION:
19915	1:50 at A3	S04	C1



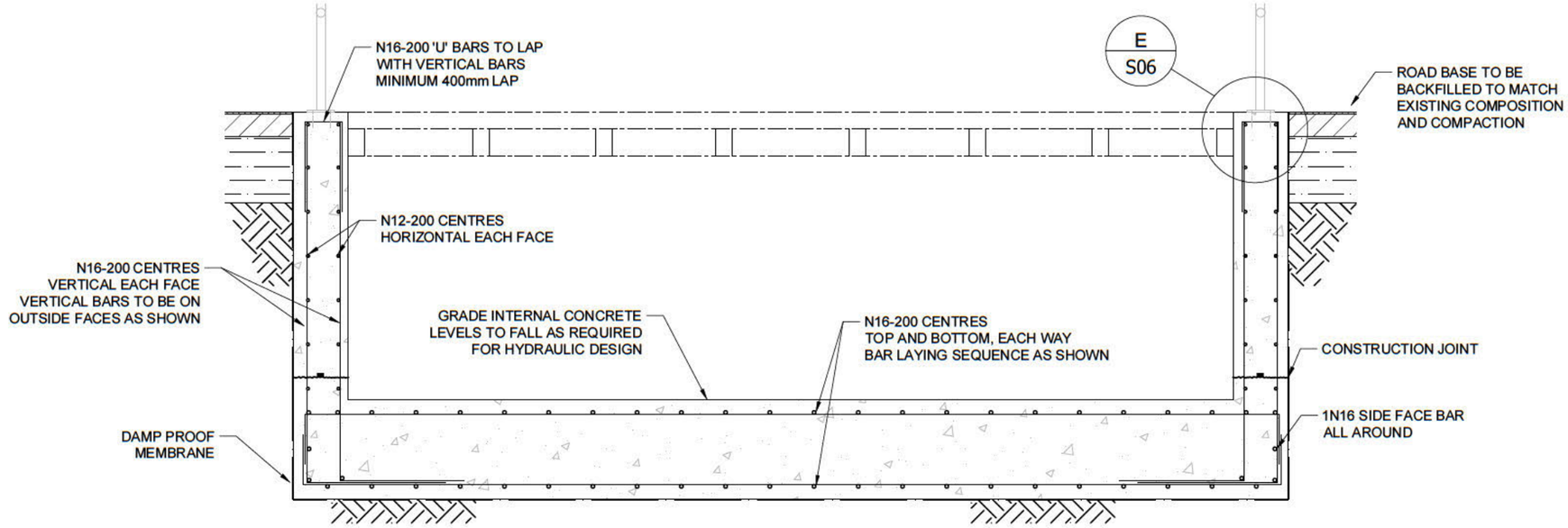
TYPICAL PIT CROSS SECTION REINFORCEMENT DETAILS

SCALE 1:25



TYPICAL PIT END WALL REINFORCEMENT DETAILS

SCALE 1:25



TYPICAL PIT LONG SECTION REINFORCEMENT DETAILS

SCALE 1:25

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REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

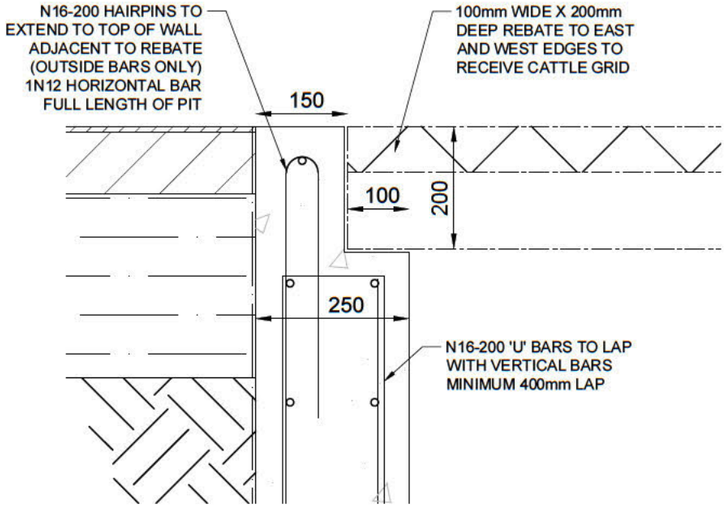
DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	JAN. 2020
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: PIT REINFORCEMENT DETAILS (1)

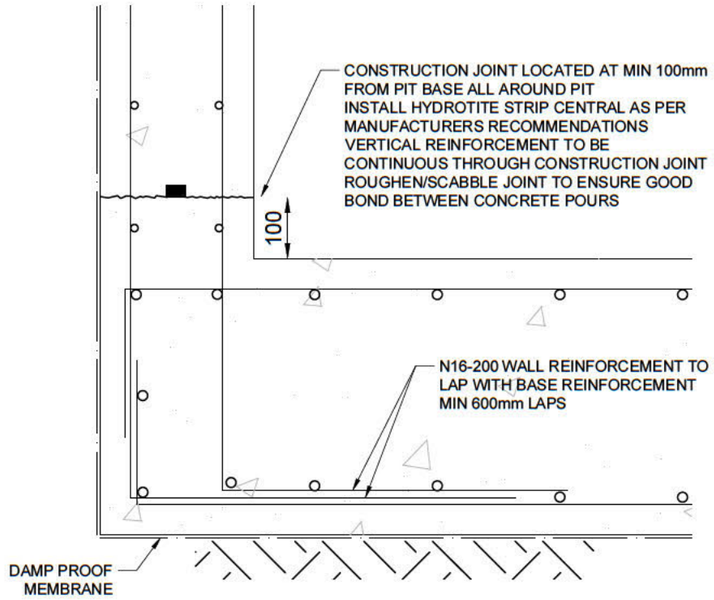
ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWING NO:	REVISION:
19915	1:25 at A3	S05	C1



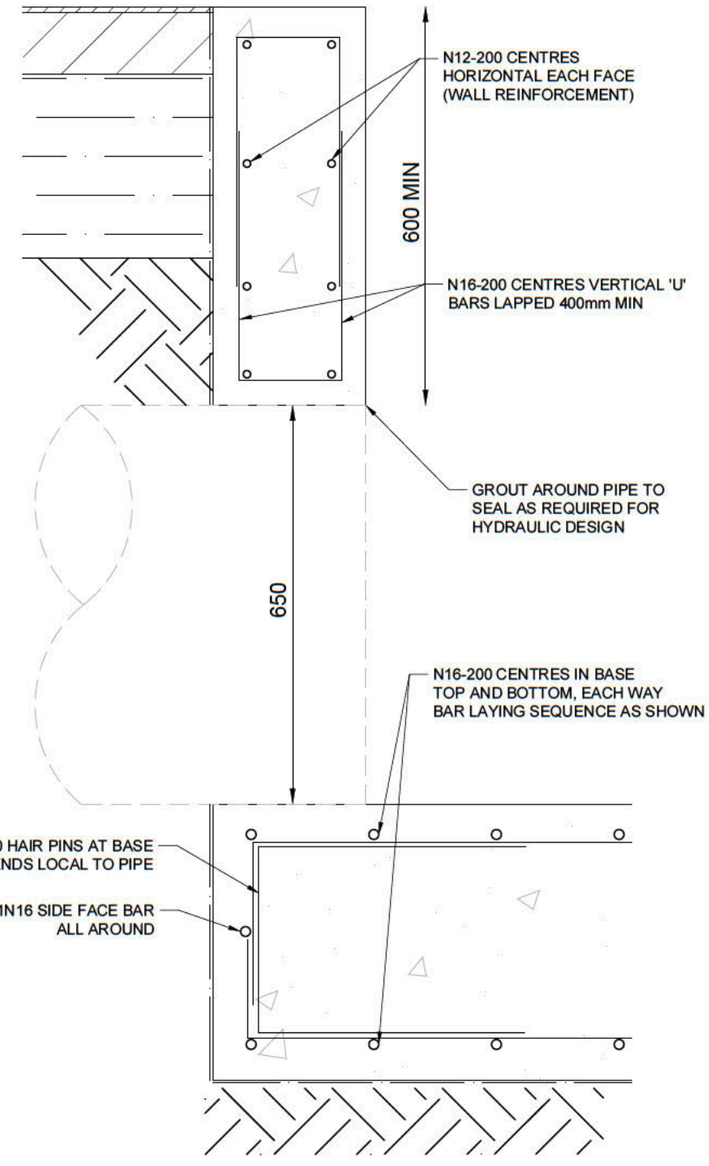
A TYPICAL EDGE WITH REBATE

SCALE 1:10



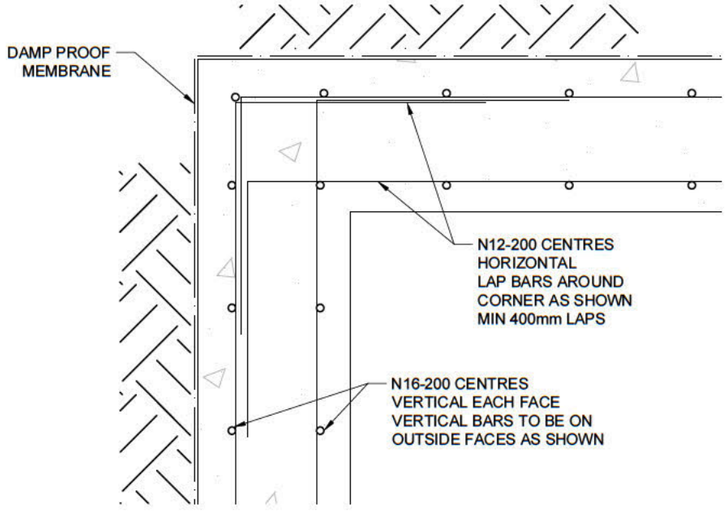
B TYPICAL CONSTRUCTION JOINT

SCALE 1:10



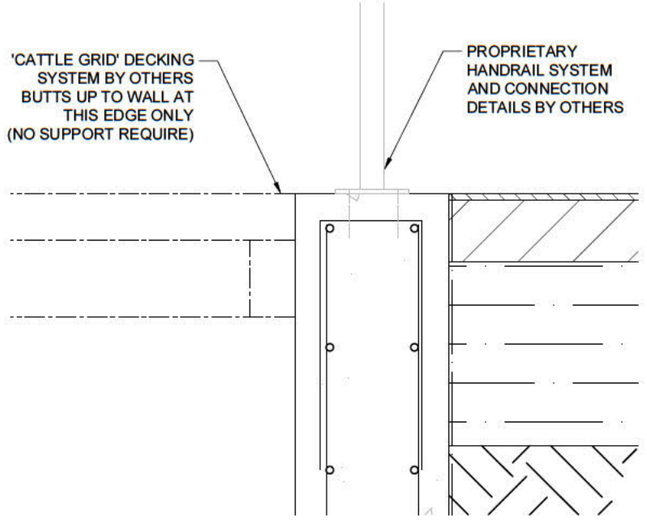
C SECTION THROUGH END WALL WITH PIPE

SCALE 1:10



D TYPICAL CORNER DETAIL (PLAN VIEW)

SCALE 1:10



E TYPICAL EDGE WITH HANDRAIL

SCALE 1:10

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REV	DATE	DESCRIPTION	BY
C1	13.01.2020	ISSUED FOR CONSTRUCTION	JL
A1	07.01.2020	ISSUED FOR CERTIFICATION	JL

AMENDMENTS

Client: HORSHAM RURAL CITY COUNCIL

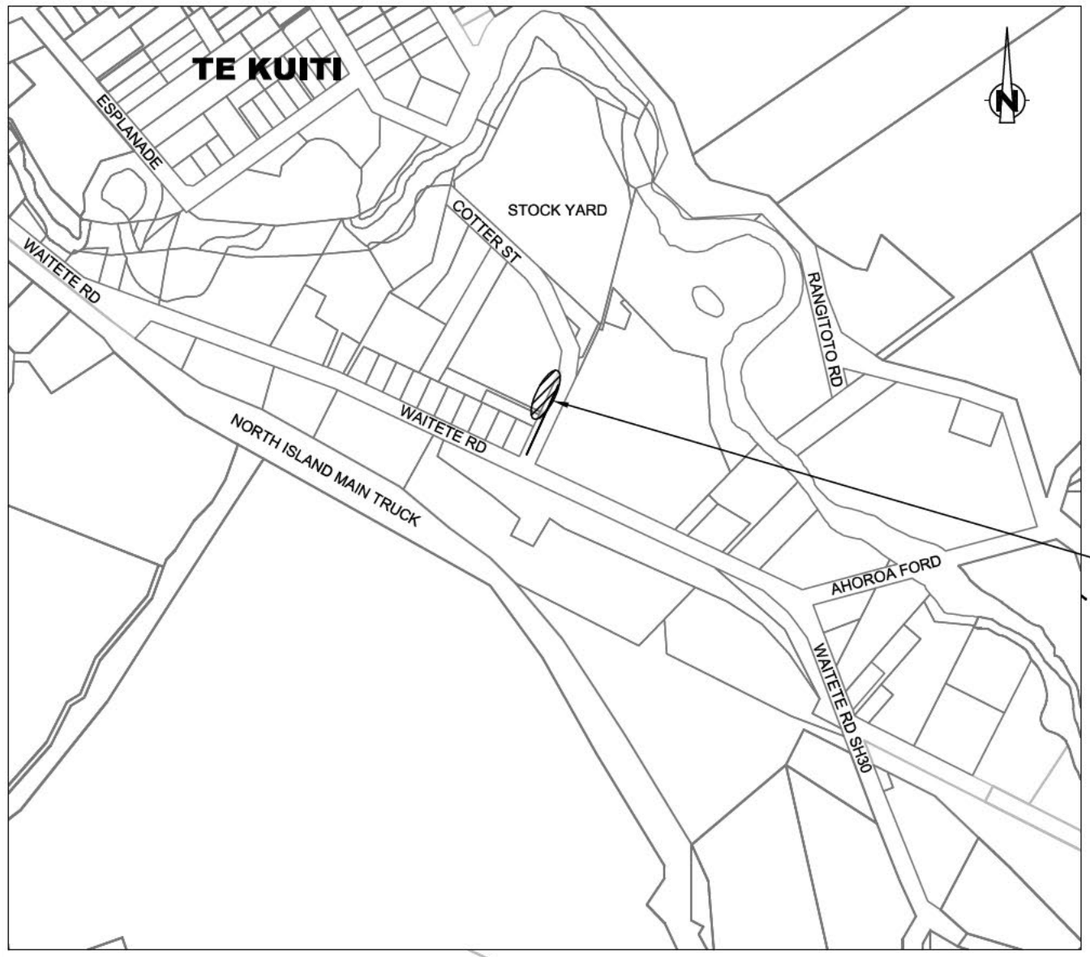
DRAWN:	[redacted]
DESIGNER:	
REVIEWER:	
RBP VIC:	EC 59615
DATE:	JAN. 2020
SHEET SIZE	A3

Project: HORSHAM REGIONAL LIVESTOCK EXCHANGE TRUCK WASHOUT PIT
68 Burnt Creek Drive
Bungalally, VIC 3401

Drawing Title: PIT REINFORCEMENT DETAILS (2)

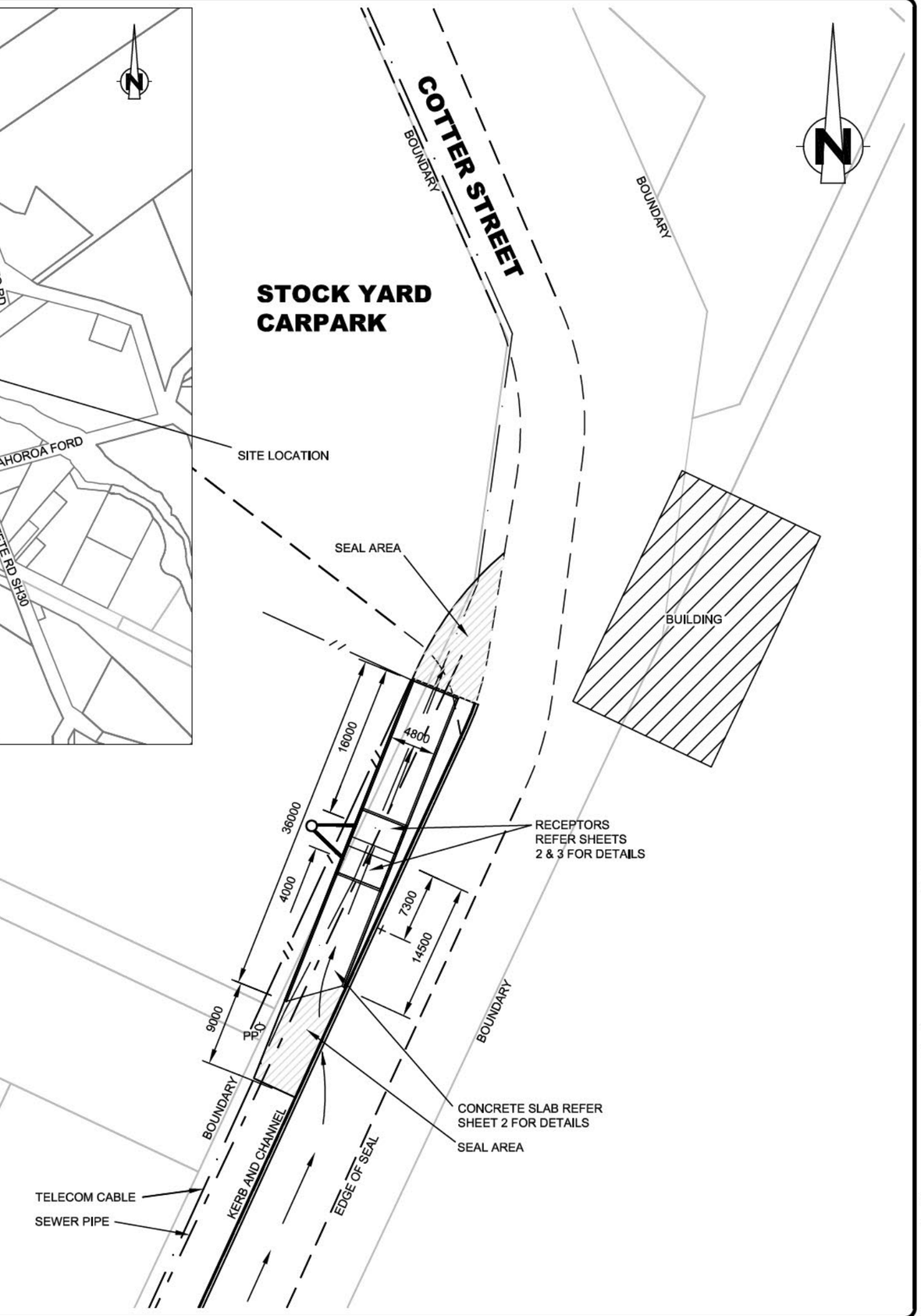
ISSUED FOR CONSTRUCTION

JOB NO:	SCALE:	DRAWING NO:	REVISION:
19915	1:10 at A3	S06	C1



LOCATION PLAN

NTS



NOTES

REV	REVISION DETAILS	APPD	DATE

Waitomo District Council

LOCATION/JOB

TE KUITI STOCK EFFLUENT DISPOSAL FACILITY

DRAWING TITLE

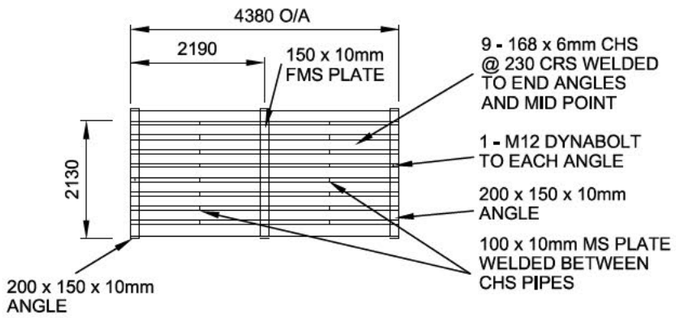
PLAN & LOCATION

CONSULTANT: Apex consultants	FIELDWORK M.K
	DESIGNED M.K
	DRAWN P.M
JOB NO. WTO1042	CHECKED
DATE. 11/09/2008	APPROVED
CLIENT:	RECOMM'D
JOB NO.	APPROVED
CAD NO.	DATE

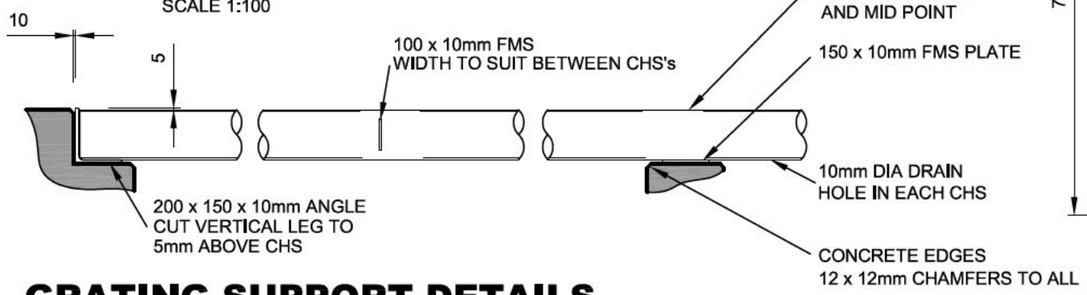
ORIGINAL SCALES A3

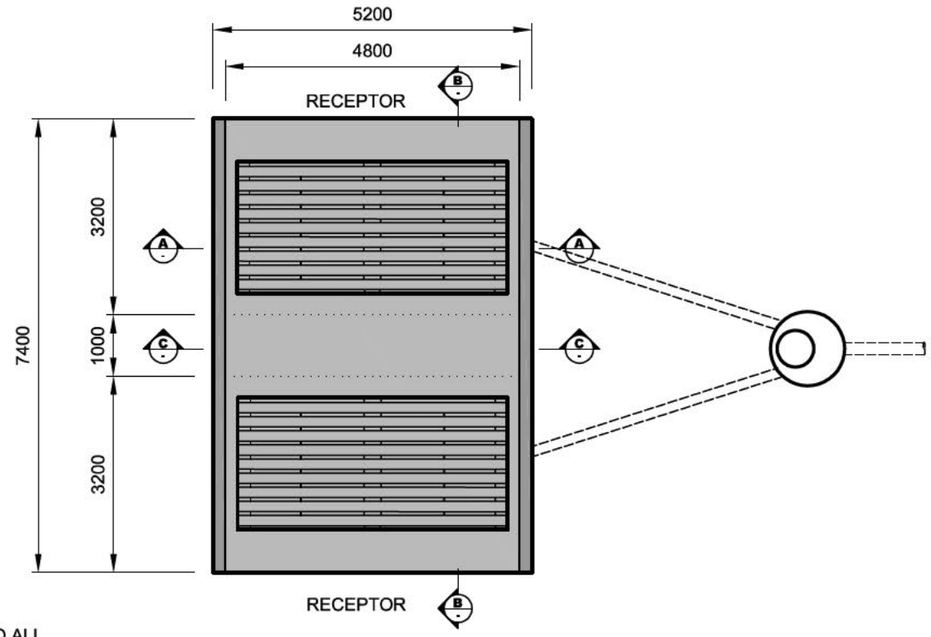
NTS

DRAWING No.	SHEET	REV.
WTO1042.00	1 OF 3	

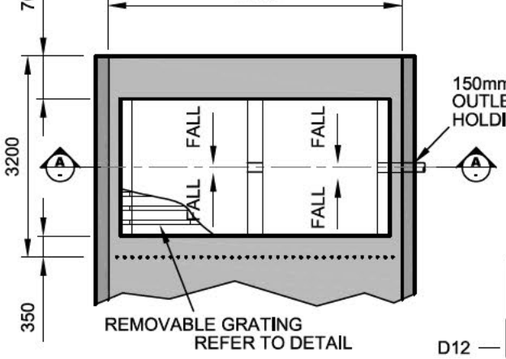


RECEPTOR GRATING PLAN
SCALE 1:100

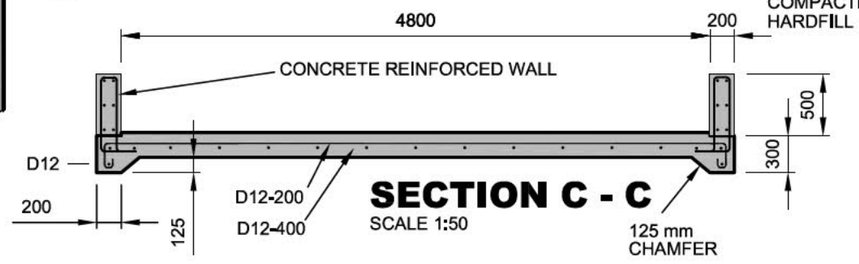




GRATING SUPPORT DETAILS
SCALE 1:20

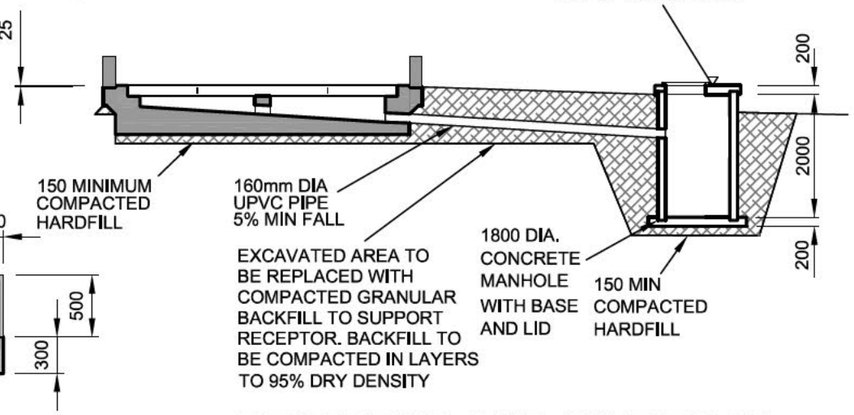


RECEPTOR PLAN
SCALE 1:100

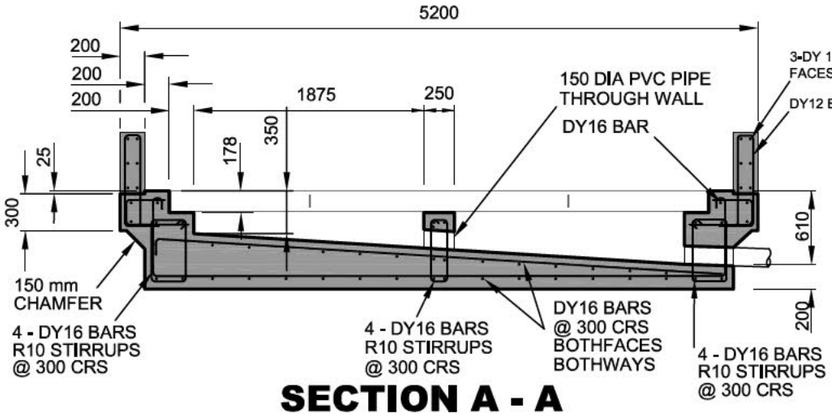


SECTION C - C
SCALE 1:50

PLAN OF RECEPTORS AND SILT TRAP MANHOLE
SCALE 1:100



RECEPTOR AND SILT TRAP MANHOLE SECTION
SCALE 1:100



SECTION A - A
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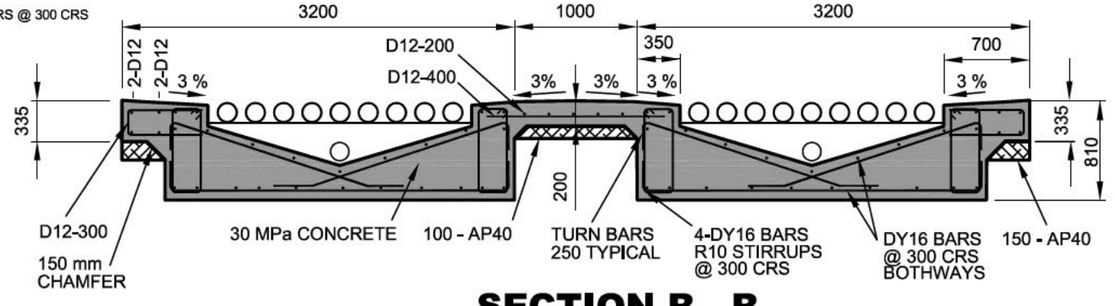


SECTION B - B
SCALE 1:50

NOTES
1. REINFORCEMENT COVER
- MINIMUM COVER FOR GROUND SURFACE IS 75mm
- MINIMUM COVER FOR AIR CONTACT SURFACE IS 50mm

REV	REVISION DETAILS	APPD	DATE

Waitomo District Council

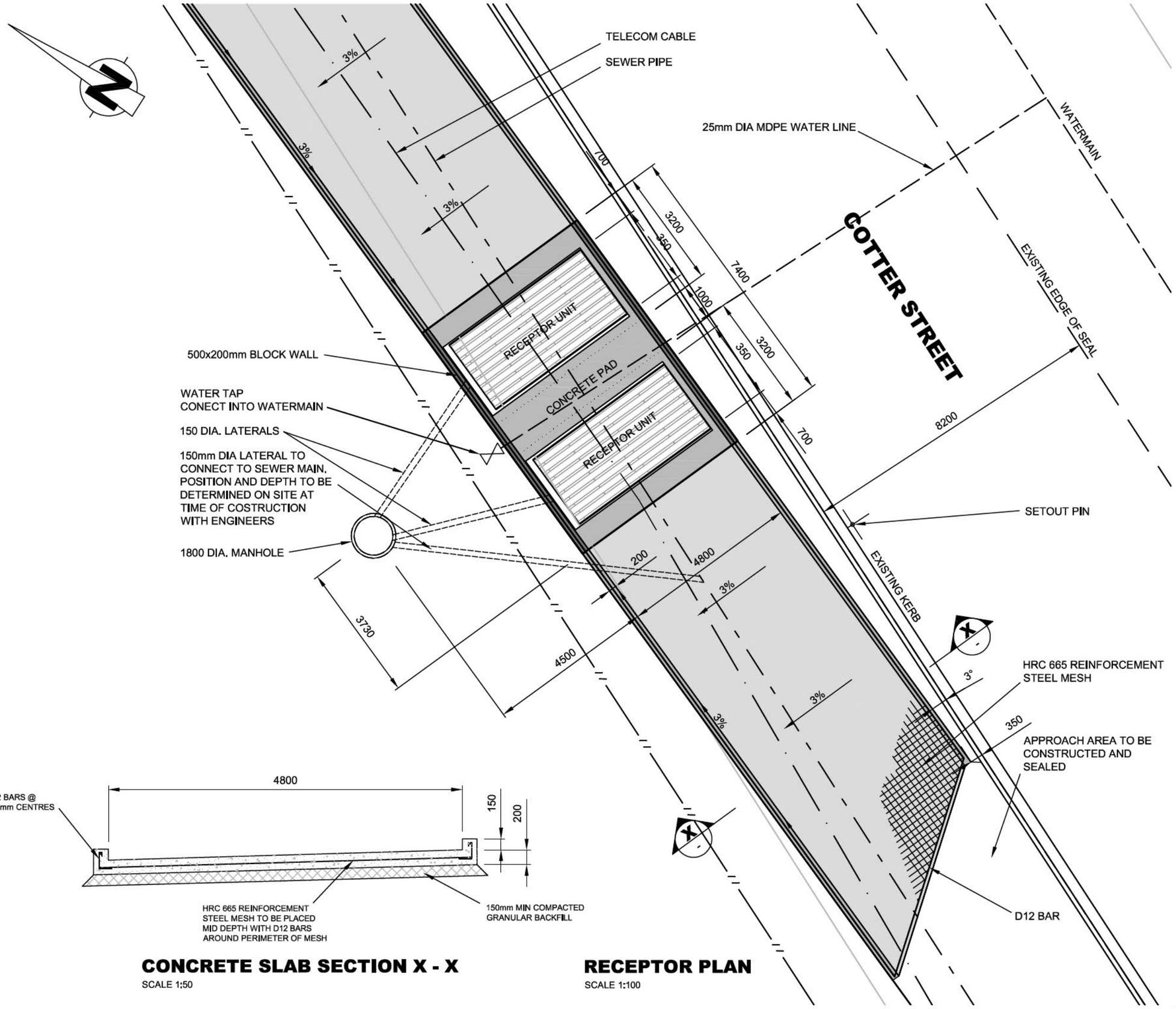
LOCATION/JOB
TE KUITI STOCK EFFLUENT DISPOSAL FACILITY

DRAWING TITLE
DETAILS

CONSULTANT: Apex Stormwater Service	FIELDWORK M.K
	DESIGNED M.K
	DRAWN P.M
JOB NO. WTO1042	CHECKED
DATE. 11/09/2008	APPROVED
CLIENT:	RECOMM'D
JOB NO.	APPROVED
CAD NO.	DATE

ORIGINAL SCALES A3
AS SHOWN

DRAWING No.	SHEET	REV.
WTO1042.00	3 OF 3	



CONCRETE SLAB SECTION X - X

SCALE 1:50

RECEPTOR PLAN

SCALE 1:100

NOTES

REV	REVISION DETAILS	APPD	DATE

Waitomo District Council

LOCATION/JOB

TE KUITI STOCK EFFLUENT DISPOSAL FACILITY

DRAWING TITLE

RECEPTOR PLAN

CONSULTANT: Apex consultants	FIELDWORK M.K
	DESIGNED M.K
	DRAWN P.M
JOB NO. WTO1042	CHECKED
DATE. 11/09/2008	APPROVED
CLIENT:	RECOMM'D
JOB NO.	APPROVED
CAD NO.	DATE

ORIGINAL SCALES A3

1:100

DRAWING No.	SHEET	REV.
WTO1042.00	2 OF 3	

Austroads

Research Report
AP-R591-19

Guidelines for the Provision of Heavy Vehicle Rest Area Facilities

Edition 1.1

Guidelines for the Provision of Heavy Vehicle Rest Area Facilities

Prepared by

David Green, Philip Roper, Lisa Steinmetz, Lincoln Latter, Kenneth Lewis and Drew Gaynor

Project Manager

Melissa O'Brien

Abstract

Heavy vehicle rest areas (HVRAs) are provided to help heavy vehicle drivers manage fatigue and comply with driving hours regulation. To aid road managers assess the need and prioritisation for HVRAs, as well as prompting consideration of issues relating to planning and design concepts, Austroads has produced this document – *Guidelines for the Provision of Heavy Vehicle Rest Area Facilities*.

This document draws on and provides an update to the 2005 National Transport Commission Guidelines. It also incorporates guidance outlined in *A Proposed HVRA Needs and Prioritisation Methodology*, published by Austroads in 2012. This document supersedes those two documents.

Edition 1.1 has been updated to include new guidance relating to heavy vehicles transporting dangerous goods, capacity of HVRA to accommodate Oversize/Overmass (OSOM) vehicles, as well as additional minor amendments.

Keywords

Fatigue, Freight, Heavy vehicle rest area (HVRA)

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Edition 1.1

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Pages 51

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www.austroads.com.au

About Austroads

Austroads is the peak organisation of Australasian road transport and traffic agencies.

Austroads' purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.

Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.

Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:

- Roads and Maritime Services New South Wales
- Roads Corporation Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department of Planning, Transport and Infrastructure South Australia
- Department of State Growth Tasmania
- Department of Infrastructure, Planning and Logistics Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
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Acknowledgement is also given to work undertaken in previous projects that the current Guidelines (this document) have drawn on, in particular 'National Guidelines for the Provision of HVRA Facilities' published by NTC in 2005 and 'A Proposed HVRA Needs and Prioritisation Methodology', published by Austroads in 2012.

Finally, acknowledgement is given to work undertaken by jurisdictions both nationally and internationally in development of jurisdictional HVRA guidelines. The Queensland Department of Transport and Main Roads guidelines, published in 2014, formed a basis for these Guidelines. Jurisdictional guidelines were reviewed during the course this project, and then adapted and further developed to form the Guidelines in this document.

Summary

Heavy vehicle drivers are often required to work for long hours. To help drivers manage fatigue and comply with driving hours regulations (by providing an opportunity for sleep and rest breaks), heavy vehicle rest areas (HVRAs) may be provided. The successful operation of HVRAs depends on many factors. These include planning, design, construction and maintenance.

This document – *Guidelines for the Provision of Heavy Vehicle Rest Area Facilities* – provides guidance for road managers on assessing the need and prioritisation for HVRA, as well as prompting consideration of issues relating to planning and design concepts in the initial set out of HVRA. While construction and maintenance needs are noted, road managers should consider these issues in their local context as well as how decisions may impact the final planning and design of the HVRA. The guidance considers both long (e.g. sleep) and short-term rests which will aid the freight industry to support safe heavy vehicle operations while meeting their workplace goals within the prescribed heavy vehicle driving hours regulatory framework.

This document provides road managers with guidance on various types of HVRA:

- Formal HVRA: Are provided/maintained by road managers to support driver rest needs. These Guidelines identify five classes of formal HVRA.
- Informal HVRA: Are not established by the road manager, rather they have evolved through ongoing use by heavy vehicles. These Guidelines identify one type of informal HVRA.

These Guidelines also recognise that other rest opportunities may be available at towns (small and large towns along a freight route and where rest by heavy vehicles is permitted and encouraged by the local government in which the town is located) and commercial facilities (including service centres and roadhouses).

These HVRA Guidelines are intended to provide general guidance and to highlight some of the key aspects to consider when designing different types of HVRA. The types of HVRA outlined in this document are intended to reflect best practice and prompt consideration of key aspects. Actual practice will depend on jurisdiction practice, available funding and resources for construction as well as ongoing maintenance. These Guidelines do not replace the need for engineering judgement in the planning for and designing of HVRA.

Contents

Summary ..... **i**

1. Introduction **1**

1.1 Context 1

1.2 Background 2

1.3 Purpose of the Guidelines 2

1.4 How to Use the Guidelines 2

1.4.1 Mapping HVRA Classification Terminology 4

2. Types of HVRAs **5**

3. Assessing Need and Prioritisation for HVRAs **6**

3.1 HVRA Strategy 6

3.2 Assessing the Need for Expansion/Upgrade or New HVRAs 7

3.3 Prioritising the Establishment or Upgrade of HVRAs 8

3.4 Assessing the Need for HVRAs Along New Sections of Road 10

4. Principles of Good HVRA Design **11**

4.1 Overview 11

4.2 Types of HVRAs 13

4.2.1 Formal HVRAs 13

4.2.2 Informal HVRAs 13

4.2.3 Other Rest Opportunities 14

4.3 Spacing and Placement of HVRA 15

4.3.1 Spacing 16

4.3.2 Placement 18

4.4 Key Safety Features 19

4.4.1 Safe Vehicle Movement and Access 19

4.4.2 Capacity and Parking Bay Size 20

4.4.3 Separation of Light and Heavy Vehicles 20

4.4.4 Separation of Vehicles Carrying Noisy Freight 20

4.4.5 Separation for Long-term and Short-term Users 20

4.4.6 Unidirectional Flow 20

4.4.7 No Reversing Movements 21

4.4.8 Security 21

4.4.9 Pedestrian Safety and Access 21

4.4.10 Signage on Approach and Within HVRAs 22

4.5 Amenities/Extras 25

4.5.1 All-weather Seal 25

4.5.2 Tables/Benches 25

4.5.3 Natural Shade 25

4.5.4 Shelter 25

4.5.5 Rubbish Bins 25

4.5.6 Lighting 26

4.5.7 Toilets 26

4.5.8 Water 26

4.5.9 Visitor Information Board 26
4.5.10 Managed Livestock Effluent Disposal Sites 27
4.6 Additional Issues 27
4.6.1 Parking Bay Orientation 27
4.6.2 Providing for People with a Disability or Mobility Difficulty 27
4.6.3 Ongoing Maintenance 27
4.6.4 Ensuring Availability of HVRAs for Heavy Vehicle Drivers 29
4.6.5 Provision for Coupling and Decoupling 29
4.6.6 Use of HVRAs by Light Vehicle Drivers 29
4.6.7 Cross-border Compatibility 29
4.6.8 Consideration for Future Demands 30
4.6.9 Dangerous Goods Vehicles 30
5. Communicating Rest Opportunities to Drivers 31
References 32
Bibliography 34
Appendix A Gippsland Safe Freight Network 37
Appendix B NHVR Heavy Vehicle Safety Initiative 38
Appendix C HVRA Layout Schematics 39
Appendix D Assessing Heavy Vehicle Crash Rates 45
Appendix E TCA Mapping of HVRAs 47
Appendix F Estimating Parking Spaces 48
Glossary 51

Tables

Table 1.1: Mapping of HVRA classification terminology 4
Table 2.1: Overview of HVRA classification hierarchy 5
Table 3.1: Primary weighting factors 9
Table 3.2: Contributory weighting factors 9
Table 3.3: Resulting priority rating 10
Table 4.1: HVRA facilities 12
Table 4.2: Key operational principles for different HVRA classes 13
Table 4.3: Site requirements for informal HVRA (designation using 3-2-1 Green Reflector scheme) 14
Table 4.4: Facilities typically available at commercial facilities and towns recognised as rest opportunities 15
Table 4.5: Issues for consideration relating to the placement of HVRAs 18
Table E 1: Recommended P adjustment values 49
Table E 2: Recommended design hour factor 50

Figures

Figure 1.1: Flowchart of HVRA assessment and provision 3
Figure 3.1: Decision process for expansion or new HVRA 8
Figure 4.1: HV rest area spacing based on HV volume and road environment 17
Figure 4.2: Example HVRA spacing 17
Figure 4.3: Symbols on rest area signage 23
Figure 4.4: 3-2-1 guidepost pattern 24

1. Introduction

1.1 Context

While people traditionally think of fatigue as 'sleepiness', it is much more than just a desire to sleep. The definition of the term fatigue covers a wide range of characteristics, including sleepiness, drowsiness and feeling tired or weary (National Transport Commission (NTC) 2016). Each outcome has its own causes, symptoms and treatments.

Fatigue may be caused due to a variety of reasons. One common cause of fatigue is from not having sufficient sleep within a prescribed timeframe. It may also be a result of a lack of motivation, feeling weary or a degradation of concentration, for example from doing a repetitive task (such as driving) for a long time.

In the context of driving a heavy vehicle where the driver may be feeling fatigued, but not sleepy, the remedy may be a change of task. However, where a driver's sense of fatigue is associated with feeling sleepy the only treatment for the driver is sleep.

Road managers can help drivers manage their fatigue through provision of rest opportunities. Heavy vehicle rest areas (HVRAs) are provided to help heavy vehicle drivers manage fatigue and work within driving hours limits. Rest opportunities may also be available at other facilities such as commercial or in town facilities. This report – *Guidelines for the Provision of Heavy Vehicle Rest Area Facilities* – is designed to assist road managers in assessing the need and prioritisation for HVRAs, as well as prompting consideration of issues relating to planning and design concepts in the initial set out of HVRAs.

Provision of HVRAs on the road network, with parking space dedicated for use by heavy vehicle drivers, enables heavy vehicle drivers to rest so that they are more alert and safer when driving. This supports the Safe System objectives, and the 'Safe People' cornerstone (Australian Transport Council 2011; Austroads 2013a)[1]. Alert and safe heavy vehicle drivers contribute to a safer road environment with less risk of fatality and serious injury crashes. Not only does the provision of HVRAs lead to a safer freight task, it also increases the reliability of freight across the entire supply chain. As reported by the National Truck Accident Research Centre in the *2017 Major Accident Investigation Report* (National Transport Insurance (NTI) 2017), fatigue contributed to 12.2% of insurance losses nationally (within the NTI-insured heavy vehicle fleet). This percentage has remained static for several years and is the focus of significant state and national investment programs. Ensuring that freight arrives at its destination with reduced levels of damage or loss, financial or otherwise, is an important factor in managing the growing freight task, improving the safety of people working in the road freight industry, and maximising the economic benefits of the freight system.

There is a shared responsibility in addressing driver fatigue and road safety issues more broadly:

- Road managers are responsible for providing HVRAs. These Guidelines are intended to assist with this aspect.
- Heavy vehicle drivers and operators need to plan journeys in accordance with heavy vehicle fatigue management regulations. This includes consideration of available HVRAs and viewing their vehicle as a workplace.
- Clients need to pay fair and reasonable prices to transport goods, recognising their position in the chain of responsibility (CoR) and the effect that unrealistic delivery deadlines can have on fatigue and compliance with the law.

1 Safe System principles have been acknowledged in successive national road safety strategies and action plans since 2003 as the guiding principles for road safety programs in Australia. The Safe System framework is key to the National Road Safety Strategy 2011–2020 (Australian Transport Council 2011) as well as Austroads guides (e.g. Austroads 2013a).

These Guidelines have been developed to: (a) assist road managers in planning for the implementation of HVRAs through outlining the types of HVRA available, (b) provide guidance on how to assess the need and prioritisation of HVRAs, and (c) outline the principles of good HVRA design. In doing so, the aim is that these Guidelines will assist road managers to plan for an environment which supports heavy vehicle drivers to rest before they re-commence driving. As such, it considers the provision for both long (e.g. sleep) and short rests.

Application of these Guidelines by road managers will assist the freight industry to support safe heavy vehicle operations while meeting their workplace goals within the prescribed heavy vehicle driving hours regulatory framework.

1.2 Background

In recognition of the growing freight task as well as changes to the driving hours regulations, there was an identified need to update the 2005 National Transport Commission *National Guidelines for the Provision of Rest Area Facilities* (National Transport Commission 2005). As such, these Guidelines draw on and provide an update to the 2005 NTC Guidelines. It also incorporates guidance outlined in *A Proposed HVRA Needs and Prioritisation Methodology* (Austroads 2012). This report supersedes those two documents.

In updating the previous NTC Guidelines, a review of jurisdictional Guidelines, both nationally and internationally, was undertaken. These jurisdictional guidelines were explored during the literature review, with concepts reviewed during the stakeholder consultation and then adapted and developed further to form the Guidelines in this report. A bibliography of all references reviewed as part of the literature review is contained at the end of this report. A list of stakeholders consulted is outlined in the Acknowledgements.

The term ‘road manager’ is used throughout these Guidelines. The term refers to national or state road agency, municipality, other body or individuals responsible for the care, control and maintenance of road infrastructure. A glossary of terms used Guidelines is provided at the end of this report.

1.3 Purpose of the Guidelines

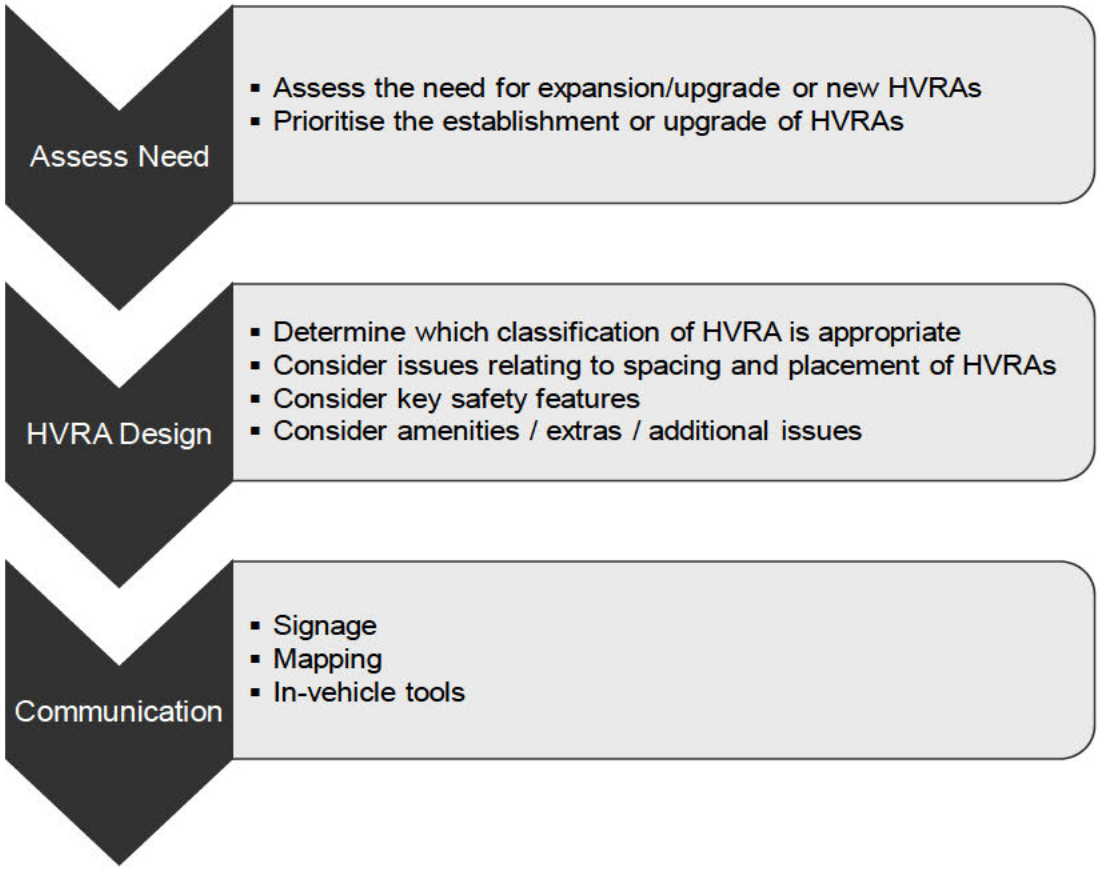
The purpose of these Guidelines (this document) is to assist road managers in the planning, design and prioritisation of HVRA facilities that accommodate the need for sleeping opportunities during heavy vehicle work.

While the Guidelines focus on heavy vehicle use of HVRAs, it is recognised that many HVRAs cater for both light and heavy vehicles. They therefore consider light vehicle needs and usage where appropriate.

1.4 How to Use the Guidelines

The flowchart in Figure 1.1 outlines the steps involved in identifying the need for HVRAs and deciding on where to put them and how good they should be. Spacing and placement of HVRAs are fundamental to their ability to safely and effectively facilitate adequate rest for drivers. Guidance on the spacing, proximity to towns and commercial facilities, and physical placement of HVRAs is discussed in Section 4.3.

Figure 1.1: Flowchart of HVRA assessment and provision



Key points to consider when using these Guidelines are as follows:

- These Guidelines are for planning purposes only. They are not prescriptive but rather they provide background and general guidance on factors to be considered in the design and planning of HVRAs.
- The types of HVRAs outlined in these Guidelines are intended to reflect best practice and prompt consideration of key aspects. Actual practice will depend on jurisdictional practice, available funding and resources for construction as well as ongoing maintenance.
- The Guidelines do not replace engineering judgement; rather, they provide an overview of key aspects to be considered, in conjunction with local road manager guidelines and policy, to support appropriate engineering judgement during the planning and design of HVRAs.
- The Guidelines provide advice on some of the key features to be considered for various classes of HVRAs. The aim is to help road managers plan for the implementation of HVRAs. Road managers should not only plan for the implementation of HVRAs but should also consider how to communicate information on the HVRAs to heavy vehicle drivers to assist their journey planning, including planning their rest breaks. They provide advice on use of on-road signage, ITS and other emerging technologies.
- Features incorporated within a HVRA will be influenced by various aspects. Engineering judgement must be exercised by the designer regarding the parameters and elements that are incorporated into designs. Users of these Guidelines must apply suitable risk management practices when determining designs, to avoid the construction of inappropriate or counter-intuitive HVRAs.
- These Guidelines recognise that there are different types of HVRA. The actual type of HVRA and the frequency along a freight route will need to be determined by the road manager responsible.
- These Guidelines focus on HVRAs provided or maintained by road managers. It is recognised that rest opportunities may also be available at other facilities such as commercial or in-town facilities.

- In conjunction to using these guidelines, road managers should consult with industry (e.g. Australian Trucking Association, NatRoad, etc) and other stakeholders to determine how to assess, plan, design and implement HVRA along freight corridors to deliver a safe freight network. An example of where road managers and regulators are already working with industry and other stakeholders to deliver a safe freight network is discussed in Appendix A and Appendix B.
- While ensuring adequate facilities and capacity are available to accommodate heavy vehicle drivers' needs is critical, road managers need to be mindful of minimising fatigue for all drivers. These Guidelines provide guidance on managing interactions between light and heavy vehicles at sites where both are accommodated. Issues relating to the use of HVRAs by light vehicles are also discussed.

1.4.1 Mapping HVRA Classification Terminology

Terminology used to describe HVRA facilities varies across jurisdictions. It is therefore acknowledged that the terminology in this document may be different from that used by some jurisdictions. Table 1.1 compares HVRA classification terminology used in different jurisdictions and throughout these Guidelines.

Table 1.1: Mapping of HVRA classification terminology

Jurisdiction	Current HVRA classification used by road managers	HVRA classification used within these guidelines (see Section 2)
New South Wales (Roads and Maritime Services NSW)	Major HVRA	Class 1 or 2 HVRA
	Minor HVRA	Class 3 or 4 HVRA
	Truck parking bays	Class 5 HVRA
	Truck informal HVRA	Informal HVRA
Victoria (VicRoads)	Major HVRA	Class 1 or 2 HVRA
	Minor HVRA	Class 3 or 4 HVRA
	Truck parking bays	Class 5 HVRA
	Truck informal HVRA	Informal HVRA
Queensland (Department of Transport and Main Roads)	Type A	Class 1 or 2 HVRA
	Type B	Class 3 or 4 HVRA
	Type C	Class 5 HVRA
	Informal HVRA	Informal HVRA
Western Australia (Main Roads Western Australia)	Major HVRA	Class 1 or 2 HVRA
	Minor HVRA	Class 3 or 4 HVRA
	Heavy vehicle HVRA	Class 5 HVRA
South Australia (Department of Planning, Transport and Infrastructure)	Major HVRA	Class 1 or 2 HVRA
	Minor HVRA	Class 3 or 4 HVRA
	Truck parking bay	Class 5 HVRA
Tasmania (Department of State Growth)	Truck parking bay	Class 5 HVRA
Northern Territory (Department of Infrastructure, Planning and Logistics)	Rest areas (light vehicles only)	N/A
	Truck parking bay	Class 5 HVRA
Australian Capital Territory (Transport Canberra and City Services Directorate)	Truck lay-bys	Class 5 HVRA
New Zealand (New Zealand Transport Agency)	HVRA	Class 1–4 HVRA
	Viewing places	No equivalent
	Utility points	Class 5 HVRA
	Historical or cultural places	No equivalent
	Composite areas	No equivalent

2. Types of HVRAs

These Guidelines present five formal HVRA classifications and one type of informal HVRA. Other facilities may also provide rest opportunities (such as commercial or in-town facilities, see Section 4.2.3).

Design considerations for different types of HVRA are outlined in Section 3.4:

- Formal HVRA are provided/maintained by road managers to support driver rest needs.

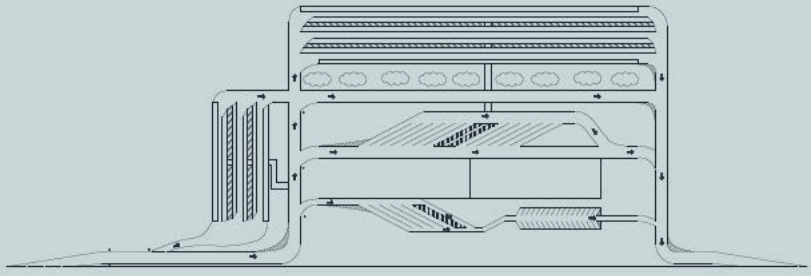
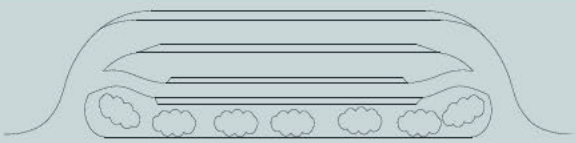
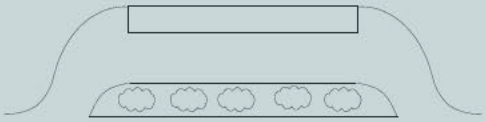
  An overview of the different concept designs are outlined in Table 2.1 with more detailed concept design drawings presented in Appendix C. Details on the design of formal HVRAs are discussed in Section 4.2.1 with details on the key elements of the formal HVRA discussed.

  Section 4 outlines key safety features and recommended amenities by HVRA classification.

- Informal HVRAs are HVRAs that have evolved through obvious signs of use by heavy vehicles; they were not established by the road manager. They may or may not be maintained by the road manager.

  Further details on informal HVRAs are discussed in Section 4.2.2, whilst guidance on the signage used on the approach to informal HVRAs is discussed in Section 4.4.10.

Table 2.1: Overview of HVRA classification hierarchy

HVRA classification	Concept drawing – basic image	Concept drawing with further details
1		Appendix C.1
2		Appendix C.2
3/4		Appendix C.3
5		Appendix C.4
Informal		Appendix C.5

3. Assessing Need and Prioritisation for HVRAs

This section provides guidance on:

- the need for a HVRA strategy (Section 3.1)
- assessing the need for expansion or new HVRAs (Section 3.2)
- prioritising the establishment or upgrade of HVRAs (Section 3.3)
- assessing the need for HVRAs along new sections of road (Section 3.4).

3.1 HVRA Strategy

A strategic approach for considering HVRA needs and opportunities is encouraged to support drivers' rest needs. Strategic planning may involve the transport industry, local and state governments, and developers to identify and prioritise HVRA sites that will help meet fatigue management objectives, including those suitable for commercial development. An ongoing committee involving key stakeholders could manage development of the HVRA network on an ongoing basis.

A detailed HVRA strategy should be developed for major highways and significant freight routes. A HVRA strategy should, as a minimum, include consideration of the following:

- Identify the mix and volume of traffic currently using the route and the forecast growth in traffic and infrastructure requirements over the next 20 years, including potential increases in the use of High Productivity Freight Vehicles (HPFVs), which are usually longer than other vehicles. The composition of traffic and type of route (e.g. major freight route, high wide-load route, or commodity route) will affect the size, design and operation of HVRAs along a route.
- Develop an inventory of existing HVRAs located on the route, the types of services and facilities, estimates of current usage and future demand. This inventory should also include other rest opportunities not provided by the road manager.
- Identify gaps in the provision of HVRAs and facilities available and where HVRAs may be over-represented.
- Develop a plan to detail the types of HVRAs required, their frequency and the facilities to be provided, the design specifications required, and the level of signage required. This plan should recognise other non-HVRA rest opportunities, including deficiencies at non-agency sites.
- Develop a program indicating the priority and costs of proposed improvements and upgrades for the route/network and a timetable for implementation (including consideration of the costs of infrastructure and ensure that mechanisms are in place to guarantee funding of HVRAs that are identified) – within jurisdiction's overall priorities for road network improvements.
- Encourage private enterprise to set up fully functioning service centres that could also act as other rest opportunities (see Section 4.2.3 for further discussion).
- Seek alternative and shared funding mechanisms (through other funding programmes) to assist road managers in the delivering of HVRAs throughout their respective jurisdictions.
- Work with local government and discuss opportunities for using local government assets for the provision of rest opportunities separate from HVRAs (e.g. other rest opportunities such as showgrounds and sale yards) where available.
- Work with local government to assist in the provision and maintenance of HVRAs.

The prioritisation for establishing and/or upgrading HVRAs should be based on maximising safety and operational outcomes within the available funding and resources.

Information about the HVRA network needs to be available to heavy vehicle drivers to assist them in their trip planning, including planning for their rests. This should be considered in the overall planning of a jurisdiction's HVRA strategy (see Section 5 for further information).

The HVRA strategy should consider freight routes which cross jurisdictional borders. Consideration should be given to enabling planning and funding mechanisms and for neighbouring jurisdictions to discuss HVRA matters to facilitate the update or expansion of HVRAs along the entire route, not just for the segment of the route within the jurisdiction. The integration of planning, particularly when assessing the spacing of facilities, should also recognise that some freight journeys will cross borders.

3.2 Assessing the Need for Expansion/Upgrade or New HVRAs

The need for HVRAs on freight routes will depend on their length, remoteness and the level of freight traffic. As freight demand changes, it will be necessary to remain aware of the extent to which the existing HVRA network is satisfying the needs of heavy vehicle operators. Road manager staff will need to liaise with the local freight industry to aid in identifying the changing needs for HVRA provision. When reviewing freight routes, the route should be assessed to determine whether:

- existing rest opportunities are sufficient, including HVRAs and non-HVRA rest opportunities along the route
- greater capacity or a higher level of amenity at existing HVRA is required
- new HVRAs are required.

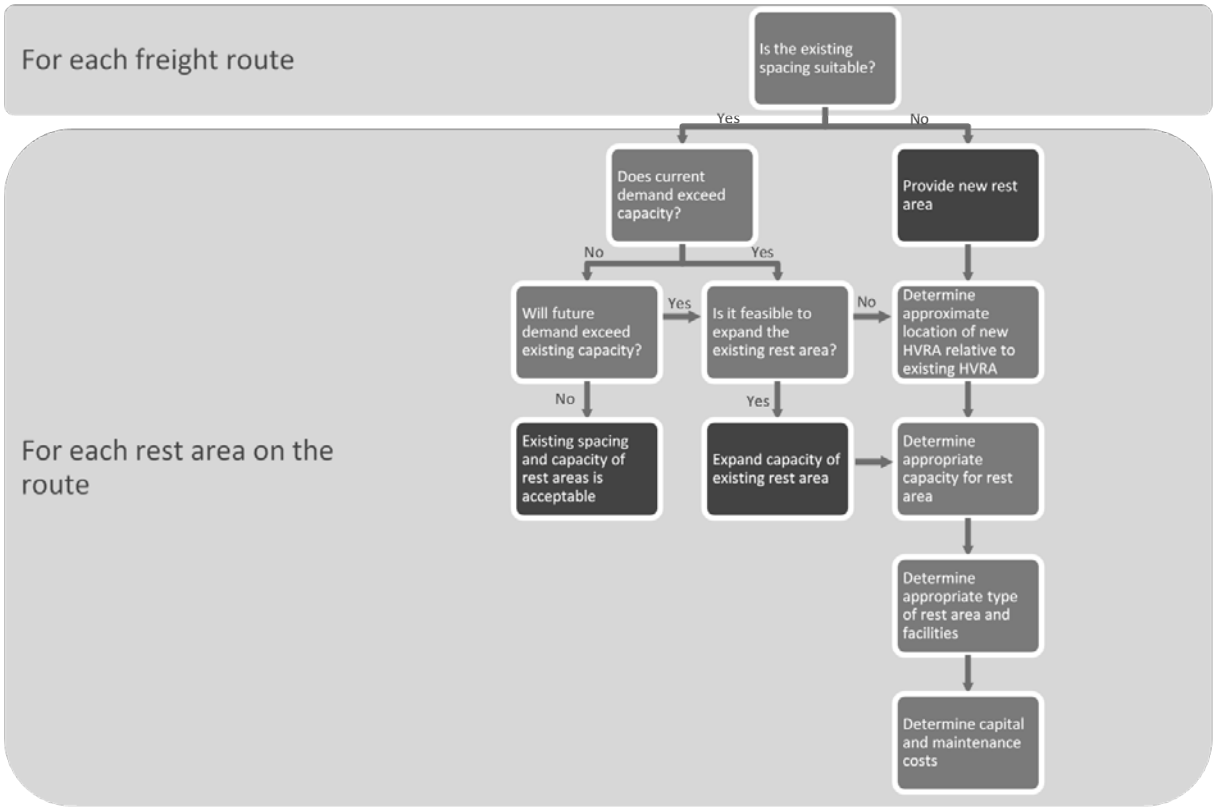
For each freight route being assessed, consider the distance between existing HVRAs (see Section 4.3). When reviewing the distance between HVRAs, consideration should be given to the start and end of the freight route and the distance between the first and/or last HVRA along the route and other contiguous freight routes. For freight routes that cross jurisdictional borders, consideration should be given to existing HVRAs that are located near the border in neighbouring jurisdictions, as these HVRAs may satisfy spacing needs.

For each HVRA along the freight route:

1. Consider whether the existing capacity and facilities satisfy the current demand. Note that a review of an existing rest area should also consider whether the facility meets the safety objectives sought (i.e. due to changes in operation or functionality).
2. Consider whether the existing capacity and facilities satisfy the future demand (see Section 4.6.8).
3. Consider whether it is feasible to expand or upgrade the existing HVRA; if an existing HVRA is unable to satisfy demand, and cannot be expanded due to local conditions, then provision of an additional HVRA should be considered.
4. For new HVRAs:
    a. an approximate location should be identified, taking into consideration spacing requirements (see Section 4.3) between adjacent (existing or proposed) rest opportunities (including HVRAs, depots, towns and commercial facilities)
    b. the appropriate HVRA type should be identified; where HVRAs are being upgraded to increase capacity, consideration should be given to whether the level of amenity provided remains appropriate, or whether this should also be upgraded
    c. or when expanding the capacity of an existing HVRAs, the capital costs associated with these works, as well as maintenance costs, should be determined. Road managers have different approaches for assessing and determining capital and maintenance costs, and the relevant local approach should be used.

The process for deciding whether to expand or provide a new HVRA is outlined in Figure 3.1.

Figure 3.1: Decision process for expansion or new HVRA



3.3 Prioritising the Establishment or Upgrade of HVRAs

Prioritising HVRA projects can help maximise safety and operational outcomes within a jurisdiction's decision-making framework. This section outlines a methodology for prioritising HVRA projects along one or many freight routes. The methodology provides guidance only and professional judgement should always be used. For each proposed new or upgraded HVRA along the selected freight route(s):

1. Select the highest applicable primary weighting from Table 3.1.

   Primary weighting factors are factors which directly influence the availability of HVRAs to assist drivers in managing their fatigue.

2. Select the highest applicable contributory weighting from Table 3.2.

   Contributory weighting factors prioritises consideration of other factors (such as crash history).

3. Once the primary and contributory weighting factors have been determined, select the corresponding priority rating from Table 3.3.

4. Once a priority rating has been determined, the HVRA needs should be ranked by the priority rating (identified in Step 3) from highest to lowest.

   Those with the highest priority ratings (i.e. Priority 7) would have preference for funding. Prioritisation of the establishment (of new) or upgrading (of existing) HVRAs should be undertaken to maximise safety outcomes (in terms of HVRA provision to help minimise fatigue) per dollar spent[2].

2 Consideration should be given to overall costs and safety benefits of a HVRA program. For example, several 'low' priority projects may have similar costs as one 'marginally higher' priority site, and thereby deliver an overall higher safety benefit. Professional judgment should be used during this decision-making process.

The primary and contributory weighting factors focus on improving safety, primarily giving high priority to sites where fatigue may be an issue. Where proposed new or upgraded HVRAs have the same priority rating, rank according to capital and maintenance costs to maximise the benefit per dollar spent. In addition, other criteria may be considered such as:

- improved productivity (e.g. reduced travel time and/or freight costs)
- improved access (e.g. improved access to ports, commercial/industrial centres, areas of population growth or tourist destinations)
- improved amenity (e.g. improved amenity and/or facilities at the HVRAs for drivers)
- environmental outcomes (e.g. reduced carbon transport footprint)
- benefit for other road users (e.g. provide HVRAs for other road users)
- industry input.

Table 3.1: Primary weighting factors

Factor	Primary weighting			
	A	B	C	D
Spacing between HVRA and other rest stops that can accommodate heavy vehicles	Spacing not sufficient to facilitate drivers to comply with fatigue management regulations	Spacing sufficient to facilitate drivers' compliance with fatigue management regulations, but future demand may make closer spacing desirable	Spacing sufficient to facilitate drivers' compliance with fatigue management regulations but current demand indicates closer spacing may be desirable	Spacing considered appropriate for route (based on fatigue or demand) for current and future demand
Capacity of HVRA		Capacity not sufficient to satisfy current demand	Capacity sufficient for current demand but not future demand	Capacity sufficient for current and future demand

Table 3.2: Contributory weighting factors

Factor	Contributory weighting		
	i	ii	iii
Heavy vehicle safety (crash) record[1]	Heavy vehicle crash rates higher than overall crash rate	Heavy vehicle crash rates same as overall crash rate	Heavy vehicle crash rates lower than overall crash rate
Heavy vehicle volume		High heavy vehicle volumes	Medium – low heavy vehicle volumes
Driving environment[2]		High demand driving environment	Low demand driving environment[3]

1 *An assessment of the relationship between heavy vehicle crash rates and overall crash rates may be made in the manner usually employed by the relevant road manager. Appendix A presents a method that can be used for comparing heavy vehicle crash rates and overall crash rates.*

2 *High-demand driving environments may contribute to the onset of fatigue faster than lower-demand driving environments. For example, a high-demand driving environment may present one or more of the following characteristics: poor surface condition, windy and/or hilly roads, narrow lane widths, roadside hazards close to the carriageway, frequent intersections spacing, undivided carriageway.*

3 *It should also be noted that a monotonous and 'low demand' driving environment may also contribute to driver fatigue. This should be taken into consideration when considering appropriate weighting (i.e. a higher weighting could be adopted).*

Table 3.3: Resulting priority rating

Primary weighting	Contributory weighting		
	i	ii	iii
A	7	7	6
B	6	5	5
C	4	3	2
D	3	2	1

3.4 Assessing the Need for HVRAs Along New Sections of Road

Section 3.2 and Section 3.3 provide guidance on assessing the need for new HVRAs or upgrading existing HVRAs on an existing road. However, HVRA needs should also be considered during the planning stage of new road constructions such as new bypasses. The need for HVRAs along a new road would depend on the length of the road and the distance to existing HVRAs nearby that may be able to serve the rest needs along the new road segment. The design and spacing requirements for any HVRAs along the new road section should be in accordance with these Guidelines. Where the old section of road may no longer be used by through traffic, this could present an option for use as a HVRA.

4. Principles of Good HVRA Design

Roadside HVRAs are provided to give heavy vehicle drivers sleep and rest opportunities, as well as enabling drivers to check their vehicles and loads.

To facilitate this, the designer must have sufficient knowledge of a route on which a HVRA is to be located, the size, configuration and manoeuvrability of vehicles that typically use the route, driving hours regulations, and the interaction of all of these factors. The determination of HVRA suitability will generally be a judgement, based upon a combination of factors; prescriptive limits cannot be established to suit every situation.

The successful operation of HVRAs depends on many factors. These include planning, design, construction and maintenance. These Guidelines focus on issues relating to the planning and design concepts to be considered in the initial set out of HVRAs. While construction and maintenance are noted, road managers need to consider these issues in their local context as well as how decisions may impact the final planning and design of the HVRAs.

Users of these Guidelines should refer to the Section 1.4. These Guidelines should be used in conjunction with jurisdiction's guidelines, engineering judgement and policy decisions to plan for and design HVRAs.

4.1 Overview

HVRA layout design should provide suitable facilities in an environment that promotes effective and safe rest and/or sleep opportunities. It is also necessary to ensure that there is adequate provision for vehicles and pedestrians to move safely within the site.

Table 4.1 presents an overview of the key safety features and amenities/extras to be considered for various classes of formal HVRAs. Further guidance regarding each element is provided in Section 4.3 to Section 4.6.

It is important to note that the design of each HVRA will vary with the expected traffic composition and volume. It is recognised that it may not be cost effective or practical to implement all features at all HVRAs. It is also possible that some of the facilities (such as toilets or a water supply) may be available at a nearby facility of another type, such as a commercial service centre. In these circumstances, the need for such facilities at the HVRA may reduce. Road managers need to exercise judgement and undertake consultation with industry to identify the necessary features. The design feature recommendations are reflected in the HVRA designs for Class 1 to Class 5, outlined in Section 4.2 and presented in Appendix C.

Table 4.1: HVRA facilities

Criteria	Facilities/features		Further discussion	HVRA classification				
				1	2	3	4	5
Spacing and placement	Demand-based spacing[1]	Time	Section 4.3	1 hour	1 hour	30 mins	30 mins	15 mins
		Distance	Section 4.3	70 to 100 km	70 to 100 km	35 to 50 km	35 to 50 km	15 to 25 km
Key safety features[2]	Safe vehicle movement and access		Section 4.4.1	■	■	■	■	■
	Capacity – present and forecast		Section 4.4.2	20+ bays	15-20 bays	10-15 bays	5-10 bays	5+ bays
	Separation of light and heavy vehicles		Section 4.4.3	■	■	▲	○	○
	Separation of vehicles carrying noisy freight		Section 4.4.4	■	▲	○	○	○
	Separation for long-term/short-term visitors		Section 4.4.5	■	▲	○	○	○
	Unidirectional flow		Section 4.4.6	■	■	■	■	▲
	No reversing movements		Section 4.4.7	■	■	■	■	■
	Security		Section 4.4.8	■	■	■	■	■
	Pedestrian safety and access		Section 4.4.9	■	■	■	■	■
	Signage on approach and within HVRA		Section 4.4.10	■	■	■	■	■
Amenities/extras[2]	All-weather seal		Section 4.5.1	■	■	■	▲	○
	Tables/benches		Section 4.5.2	▲	▲	▲	▲	○
	Natural shade		Section 4.5.3	■	■	■	■	▲
	Shelter		Section 4.5.4	▲	▲	▲	▲	▲
	Rubbish bins		Section 4.5.5	▲	▲	▲	○	○
	Lighting		Section 4.5.6	▲	▲	▲	○	○
	Toilets		Section 4.5.7	■	▲	▲	▲	○
	Water		Section 4.5.8	▲	▲	○	○	○
	Visitor information board		Section 4.5.9	▲	▲	○	○	○
	Managed livestock effluent disposal sites		Section 4.5.10	▲	▲	▲	▲	▲

1 *Suggested spacing only. Actual spacing of HVRA should be based on a variety of factors. Refer to Section 4.3.1 for further guidance.*
2 *Additional issues (Section 4.6) should also be considered.*

Key: ■ Facility/feature is required, ▲ Facility/feature should be provided where practicable, ○ Facility/feature is optional.

4.2 Types of HVRAs

This document outlines five classifications of formal HVRA (Section 4.2.1) and one informal HVRA (Section 4.2.2). Rest opportunities may also be available at other facilities such as commercial or in town facilities (see Section 4.2.3). The following sections describe the HVRA types and their typical uses.

4.2.1 Formal HVRAs

HVRAs provide an opportunity for drivers to sleep and take rest breaks as well as enabling drivers to check their vehicles and loads. Formal HVRAs are provided/maintained by road managers to support driver rest needs. Facilities and amenities provided at HVRAs vary depending on the class of HVRA (refer to Table 4.1 for an overview of the key safety features and amenities/extras to be considered). Some HVRAs cater specifically for heavy vehicle drivers; some provide separate parking for heavy and light vehicles, while others allow access for all vehicles.

These Guidelines outline five classifications of formal HVRA. Class 1 and Class 2 provide the highest level of service. Key operational principles for various classes of HVRA are outlined in Table 4.2.

Table 4.2: Key operational principles for different HVRA classes

Key features/principles	HVRA classification		
	1 & 2	3 & 4	5
Unidirectional flow	✓	✓	✓
No reversing movements (pull-through (clearway) capability)	✓	✓	✓
Safe vehicle movement and access, including accommodating dimensions reflecting the likely maximum truck size (this may include oversize/overmass (OSOM) vehicles operating under permit conditions)	✓	✓	✓
Minimise opportunity for conflict between vehicles and pedestrians	✓	✓	
Separation of light and heavy vehicles	✓		
Separation of vehicles carrying noisy freight	✓		
Separation for long term/short term visitors	✓		

An overview of concept designs for each of the HVRA classes is presented in Table 2.1, with more detailed concept design drawings presented in Appendix C. It is important to note that the designs presented are conceptual only. Any genuine designs should reflect local practice while the dimensions and size of the HVRA (including the number of parking facilities, parking bay length) should accommodate the current and projected traffic composition and volume.

4.2.2 Informal HVRAs

Informal HVRAs are not established by the road manager, rather they have evolved through ongoing use by heavy vehicles. They may or may not be maintained by the road manager. Any informal HVRA may be upgraded to a formal HVRA should the location prove valuable to industry and the site characteristics being amenable to a formal facility.

Informal HVRA sites have no engineering design. Investigation should be undertaken to determine if they meet requirements outlined in Table 4.3. Where these requirements are met, they may be designated with green reflectors (known as the 3-2-1 Green Reflector scheme) rather than formal signage. Guidance on providing notice for informal HVRAs is discussed in Section 4.4.10. Sites marked with green reflectors should be checked regularly to ensure the quality of the site is maintained. Alternatively, reflectors should be removed if a site has deteriorated to an unsuitable condition for heavy vehicle use, or if the reflectors have been installed by parties other than the road manager.

Informal HVRAs should be de-commissioned and closed if their location and performance are less than desirable and if appropriate alternative HVRAs are located nearby.

Table 4.3: Site requirements for informal HVRA (designation using 3-2-1 Green Reflector scheme)

Feature	Requirements
Site conditions	• Able to accommodate at least one of the largest heavy vehicles that legally operate on the route safely clear of the carriageway. Drainage system, road edge and embankment must not be detrimentally affected by heavy vehicle movements. • Hard standing area suitable for heavy vehicles to stand without damage or bogging. • Sufficient set back from roadside hazards to not prove to be an additional hazard to drivers, especially at night (i.e. gullies, drops in embankments).
Site access	• Safe ingress and egress, good shoulder formation and a relatively smooth transition between the edge of the through lane and the HVRA.
Sight distance	• Minimum 200 m sight distance to each marker. • Entry/exit sight distance in accordance with jurisdiction's guidelines.
Placement	• Consistent with formal HVRA recommendations on topography, road alignment, environmental factors, proximity to freeway/motorway interchanges and local planning guidelines (see Section 4.3.2). • Should be in a safe location (a site risk/hazard assessment should be undertaken). • Located away from properties, rural access roads and intersections so headlight glare is not an issue. • Not located at the base of a hill, due to acceleration requirements of heavy vehicles.
Maintenance	• Condition checks of guide posts and reflectors to ensure they are in place, unobstructed and clean. • Surface condition of the site should be periodically checked and maintained in accordance with jurisdiction's guidelines.

Source: Adapted from Queensland Department of Transport and Main Roads (2013); Roads and Maritime Services (2016).

4.2.3 Other Rest Opportunities

These Guidelines provide guidance on HVRAs provided/maintained by road managers. It is recognised that rest opportunities may also be available at other facilities such as commercial facilities (including service centres and roadhouses) and in town facilities as outlined below. These facilities may provide a higher level of service and amenity than HVRAs. These should all be considered as part of the HVRA strategy.

- Commercial facilities (including service centres and roadhouses)

  These are commercial premises that may be considered premium HVRAs. They are built to accommodate all vehicle types, including heavy vehicles, and provide an opportunity to purchase items such as fuel and refreshments. Additional facilities (such as accommodation and showers) may be provided. Major motorways/freeways and highways are likely to feature service centres, while lower volume or remote highways may feature roadhouses. Parking at smaller facilities may be a combination of on-site and on-road parking, rather than a wholly on-site supply. Where appropriate, sites may be identified and prioritised for commercial development through planning and consultation with transport industry, local and state governments and developers. This planning could consider commercial viability, roles and risk sharing. In some cases, a HVRA previously provided by a road agency may become a commercial development. Alternatively, road agencies may consider working with commercial operators to make commercial facilities suitable for HV rest opportunities (see discussion below and Table 4.4).

- In-town facilities

  Use of towns may provide opportunities for rest breaks, particularly where the towns provide facilities such as toilets, showers, fuel and food. However, use of towns as an alternative to HVRAs should be determined in consultation with local government, to ensure that use of the town as a rest area is supported by the town. In some instances, it may require provision of a suitable parking area for heavy vehicles in the town. Alternatively, an opportunity for parking and/or decoupling may be provided on the outskirts of town. Provision of coupling and decoupling areas is discussed further in Section 4.6.5.

Where use of a town is supported by the local government, this facility should be communicated to drivers as a potential HVRA in the same manner as HVRAs located between towns are communicated to drivers. Signage may also be needed to guide drivers to the appropriate stopping area within a town. Refer to Section 4.4.10 for discussion on signage.

Amenities available in towns and commercial facilities may vary from site to site and may not be available on a 24-hour basis. In these circumstances, consideration should be given to establishing a purpose-built HVRA.

To be recognised as a rest opportunity, and therefore considered as part of a HVRA strategy, commercial or town facilities should provide those elements listed below in addition to the elements listed in Table 4.4:

- be approved for use for rest by the operator of the commercial facility or approved by the local government responsible for the town
- adequate parking to satisfy demand (across a 24-hour period)
- desirably separate long-term and short-term rest areas to enable drivers to get adequate sleep if required (the long-term rest area should be located away from noisy areas)
- desirably facilitate unidirectional traffic flow
- provide for pull-through capability (i.e. no reversing movements)
- enable trucks to access the site in all weather
- be supported by on-road signage
- accommodate likely maximum truck size (including OSOM vehicles operating under permit conditions).

Table 4.4: Facilities typically available at commercial facilities and towns recognised as rest opportunities

Key elements	Type of other rest opportunity		
	Commercial		Town (subject to approval by LGA)
	Freeway/motorway service centre	Roadhouse	
Separation for vehicle types	▲	▲	○
Tables	■	▲	▲
Seating	■	▲	▲
Shelter	■	▲	▲
Rubbish bins	■	▲	▲
Natural shade	■	▲	■
Lighting	■	▲	■
Toilet	■	▲	▲
Water	■	▲	▲
Visitor information board	▲	○	○

Key: ■ Facility/feature is likely to be present, ▲ Facility/feature may be present, ○ Facility/feature is less likely.

Source: Adapted from Austroads (2012).

4.3 Spacing and Placement of HVRA

Issues relating to spacing and placement of HVRAs are fundamental to their ability to safely and effectively facilitate adequate rest for drivers. Guidance on the spacing, proximity to towns and commercial facilities, and physical placement of HVRAs is detailed below. Some issues discussed in Sections 4.4, 4.5 and 4.6 may influence decisions relating to spacing and placement of HVRAs.

4.3.1 Spacing

Spacing requirements for HVRAs will vary considerably across freight routes throughout Australia and New Zealand. Requirements on higher volume and relatively shorter freight routes are quite different from the less heavily trafficked, longer and extremely remote freight routes.

Between commercial facilities and/or towns

Intervals between rest areas depend on the classification of rest area, the volume and composition of traffic and the demand for parking and rest opportunities identified in the HVRA strategy for a given route. Other factors that may influence spacing of HVRAs include seeking to maximise safety within available funding and resources, consideration of heavy vehicle driver needs, crash risk factors, hazard assessments, ability for drivers to comply with fatigue regulations and jurisdictional guidelines. In view of this, the road manager may elect to implement spacing of HVRAs that accommodates (see Figure 4.1):

- Fatigue requirements – at a minimum (particularly on remote lower traffic volume freight routes), spacing will be influenced by the need to facilitate compliance with fatigue management regulations as well as speed limits, road and environment conditions. Consultation with industry may also help identify spacing that is convenient for drivers, as well as helping to facilitate compliance with fatigue management regulations. As traffic volumes (and therefore demand) increase along freight routes, it may be necessary to reduce spacing and/or increase the capacity of HVRAs.
- Demand-based spacing – as demand increases, the spacings outlined below (and in Table 4.1) are suggested. Ranges of distance are provided in recognition of the varying travel speeds that will be achieved by vehicles travelling in different road environments, due for example to traffic congestion in urban areas or steep grades in mountainous regions. Different classes of HVRA provide different facilities and therefore higher-order HVRAs may be spaced further apart from lower-order facilities:
  - Class 1 and Class 2 HVRAs should be approximately 1 hour of driving time or 70–100 km apart
  - Class 3 and Class 4 HVRAs should be approximately 30 minutes of driving time or 35–50 km apart
  - Class 5 HVRAs should be approximately 15 minutes of driving time or 15–25 km apart.
- Intermediate – where volumes are at an intermediate level, the spacing of rest areas to satisfy fatigue requirements may not provide sufficient capacity for all vehicles.

Spacing of HVRAs, and their individual capacities, need to be considered jointly. That is, it will be necessary to consider: (1) whether existing spacing provides sufficient rest opportunities for heavy vehicle drivers to comply with the fatigue management regulations, and (2) whether it is feasible to expand the existing HVRA to meet increasing demands (as traffic volumes increase). If an existing HVRA is unable to satisfy demand, and cannot be expanded due to local conditions, provision of an additional HVRA should be considered.

Spacing of HVRAs along a freight route should also take into consideration whether the location of need for a HVRA is between or is in proximity to towns and/or commercial facilities.

A route will often feature a mixture of HVRA types along its length. Provision of a higher-order HVRA may mean a route can have longer intervals between HVRAs, compared with shorter intervals where lower order HVRAs are provided. An example is illustrated in Figure 4.2.

It should be noted that inclusion of lower-order HVRAs at shorter intervals may be desirable due to the potential to then:

- accommodate increased demand along a route over time
- provide flexibility in rest opportunities for drivers
- provide dedicated HVRAs (rather than mixed light and heavy vehicle facilities).

It is noted that the spacing is suggested and may not be achievable for all heavy vehicle routes. For remote roads in particular, the actual spacing of HVRAs implemented by road manager should be determined based on their decision-making frameworks, with the objective of providing sufficient rest opportunities for heavy vehicle drivers.

Ultimately, the spacing of HVRAs between towns and/or commercial facilities will depend on many factors such as:

- heavy vehicle drivers' needs, crash risk factors, hazard assessments, average annual daily traffic (AADT), traffic composition and available funding and resources
- ability of heavy vehicle drivers to be able to meet the fatigue management regulations along the route
- jurisdictional guidelines
- existing alternative stopping opportunities (including commercial facilities, informal HVRAs, heavy vehicle assembly areas and heavy vehicle wash down areas).

Figure 4.1: HV rest area spacing based on HV volume and road environment

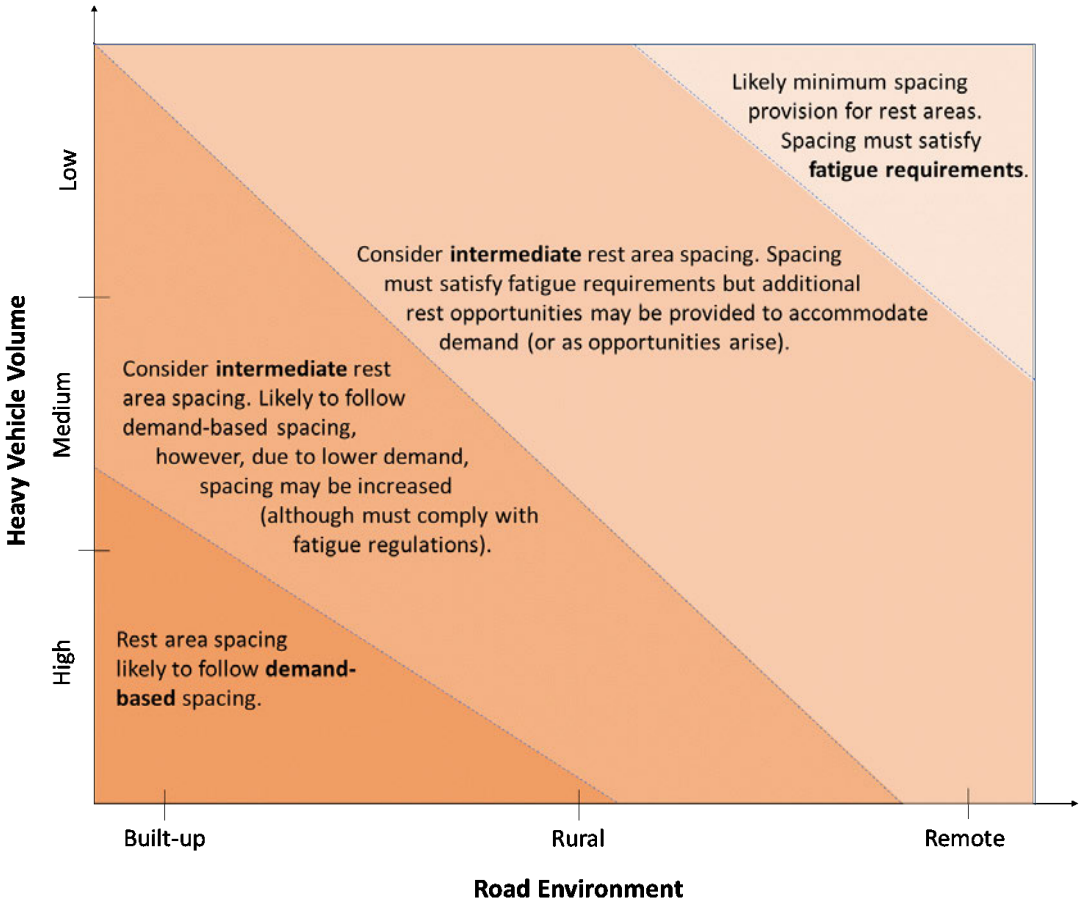
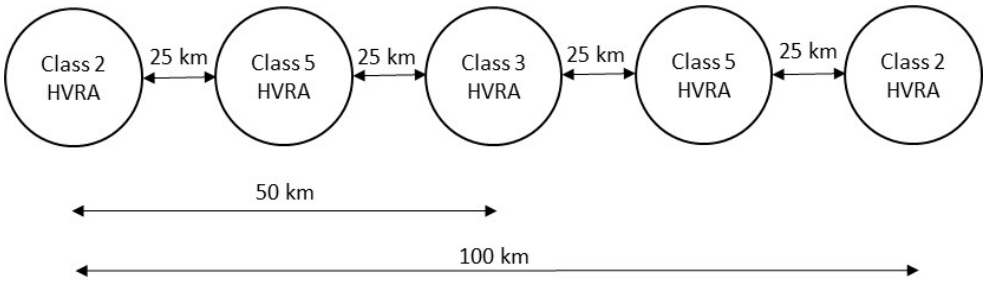


Figure 4.2: Example HVRA spacing



Proximity to commercial facilities and/or towns

When commercial facilities or towns are present (and their use as a heavy vehicle rest opportunity is supported – refer to Section 4.2.3), these may be considered as part of the HVRA strategy along the route and treated as an equivalent Class 1 or 2 HVRA. Spacing of HVRAs before and after these opportunities may be in accordance with Table 4.1.

Consideration should be given to the impacts of town bypasses and whether this may impact opportunities for rest.

Use of a commercial facility or town should be communicated to drivers in the same manner as HVRAs. Refer to Section 4.4.10 for discussion on signage.

Where use of a commercial facility or town is not supported by the responsible operator or local government respectively, HVRAs may be located on the approach or departure side to accommodate the desired HVRA spacing. In these cases, heavy vehicle drivers should be encouraged to use the HVRA and not encouraged to use the commercial facility or town.

4.3.2 Placement

When planning new HVRAs or the upgrading of existing HVRAs, the physical site characteristics must be examined. This includes examining issues associated with topography, landmarks or the environment. The location of watercourses and utilities, the proximity to major interchanges and the need for additional land both now and in the future must also be examined. Scenic viewpoints should also be considered. A summary of issues for consideration relating to the placement of HVRAs is provided in Table 4.5.

Table 4.5: Issues for consideration relating to the placement of HVRAs

Issue	Comment
Topography	The topography (such as deep gullies, rolling hills or high cuttings) should be taken into consideration. To maximise the safety and convenience for heavy vehicle drivers, HVRAs should not be located on steep grades. In addition, HVRAs should preferably be located: • where there is adequate sight distance (in accordance with Austroads and road manager design guidelines) to facilitate entry and exit to the HVRA • ideally on flat terrain (steep grades pose safety and access challenges for larger vehicles): - where the topography is undulating, place the HVRA on or just after a hill crest; this will assist with deceleration, acceleration and reducing passing vehicle noise - this should be supported by appropriate warning signs - deceleration and acceleration lanes suitable for heavy vehicles to safely manoeuvre into/out of the HVRA should be provided • so that flat ground can be provided within the HVRA, keeping in mind the need for adequate drainage. Flat terrain is more conducive to sleep. This point also applies to camber; beds are positioned across truck cabins and a camber on the parking area can affect a driver's ability to sleep. In addition, some freight requires flat terrain to park (for example livestock).
Road alignment	HVRAs should be located on relatively straight road alignments, to maximise sight distance for drivers entering/exiting the facility.
Provided in pairs	HVRAs should be provided in pairs on freeways and major roads (i.e. on each carriageway for divided roads, on both sides of an undivided road, and within a short distance of each other). Where paired HVRAs cannot be provided opposite each other, they should be staggered in the direction of approaching traffic (so that a driver reaches the HVRA on the left side of the road before seeing one on the other side of the road) to discourage cross-median vehicular movements or right turns across opposing traffic, and to deter drivers from parking on shoulders and walking across the carriageway. On remote low-volume routes paired HVRAS may not be feasible. These should be located such that sight distance is adequate to allow drivers to safely turn right into the facility, and designed to encourage unidirectional flow within the facility.
Points of interest	Where a rest area is intended for both heavy and light vehicles, consideration should be given to existing landmarks, scenic viewpoints and tourist interest areas that may make the rest area attractive for passing motorists.

Issue	Comment
Proximity to freight movement generators	HVRAs may be located to serve the needs of drivers travelling to freight generators (e.g. freight hubs, intermodal interchanges). Consideration should be given to providing a HVRA prior to freight generators, to provide a rest opportunity before undertaking activities at the freight movement generators (such as unloading and loading).
Environmental factors	To preserve the environmental qualities of an area, each potential site should be assessed to identify whether a HVRA may adversely impact local fauna and flora, water quality, noise quality or air quality.
Historical and cultural sites	Placement of HVRAs should avoid impacting areas of historical, archaeological or culturally significance.
Utilities	Access and availability of any required utilities (e.g. electricity or water) may influence the placement of a HVRA.
Proximity to freeway/motorway interchanges	Unless the HVRA is integrated with an interchange (which may be preferred due to other requirements of the installation), HVRAs should be located sufficiently distant from interchanges to separate manoeuvring associated with HVRA access from manoeuvring associated with the interchange (and therefore minimising potential operational and safety impacts). Where a potential site is located near a freeway interchange, a traffic analysis may be necessary: • where a HVRA is to be established near an existing freeway interchange, a minimum distance of 500 metres from the end of the interchange ramp taper to the start of HVRA taper should be provided • where existing service facilities coincide with proposed interchanges, it may be possible to design the interchange to accommodate an existing, or an enhanced HVRA facility. If a service facility is located abutting a freeway off-ramp it should be designed to provide safe access from the ramp and discourage vehicles from parking along the ramp.
Land availability	Consideration should be given to reserving or acquiring necessary land to allow for expansions or upgrades to accommodate future demand (discussed further in Section 4.6.8).
Quiet location	This is particularly important for HVRAs that are used for sleeping. Busy HVRAs may experience high levels of noise which may pose problems for drivers wishing to sleep; consideration may be given to providing a secondary HVRA (possibly with fewer amenities) near a town, depot, trailer exchange or busy HVRA (that may be noisy with high turnover) as an alternative, quiet rest location.
Shielding from passing headlights	At HVRAs used for sleeping, the design should include visual barriers such as trees and shrubs, or other suitable barriers, to prevent disturbance caused by headlights of passing vehicles. This issue can also be addressed with careful design of parking space orientation (see Section 4.6.1).
Security	For low-demand facilities, consider locating the HVRA within view of the road to enable road traffic to provide a level of security. Appropriate lighting should also be provided with consideration given to the provision of CCTV and signage highlighting the presence of the HVRA.
Local planning guidelines	Where local planning guidelines exist (e.g. from the local government), these should be taken into consideration when considering placement (and design) for HVRAs.
Land acquisition	Issues relating to land acquisition (e.g. flora and fauna, farms, private residences, areas of historical or cultural significance) should be taken into consideration.

4.4 Key Safety Features

This section provides additional details on the key safety features presented in Table 4.1.

4.4.1 Safe Vehicle Movement and Access

The design should accommodate safe ingress and egress (including deceleration and acceleration lanes where necessary) for all expected heavy vehicle types, in accordance with the required sight/stopping distances specified by the Austroads *Guide to Road Design Part 4: Intersections and Crossings: General* (Austroads 2017a) and any applicable road manager supplements.

The layout of the HVRA and its access roads/aisles should be designed to ensure safe operation and freedom of traffic movements and accommodate manoeuvring into and out of parking bays by all expected heavy vehicle types suited to the route. The Austroads *Design Vehicles and Turning Path Templates Guide* (Austroads 2013b) and AS 2890 (Set):2009 provide useful guidance.

4.4.2 Capacity and Parking Bay Size

The size of the HVRA will be largely determined by its required capacity. The capacity of a HVRA relates to the number of parking spaces available for heavy and/or light vehicles. Factors that should be considered when assessing capacity include length of stay, number of heavy and light vehicles using the HVRA, current and expected future demand, different types of heavy vehicles and different freight types (e.g. semi-trailers, B-Doubles, refrigerated, livestock, etc.) and the distance to next HVRA/rest opportunity[3]. The largest heavy vehicle type expected on the route should be accommodated. Consideration should be given to whether the existing capacity meets current and/or projected demand as discussed in Section 4.6.8. Parking bay dimensions should meet the minimum requirements specified in the Austroads Guide to Traffic Management Part 11: Parking (Austroads 2017c) and in AS 2890 (Set):2009 Parking Facilities.

The capacity of the HVRA should take into consideration the potential and likelihood of OSOM vehicles using the site along with their potential to impact on its functionality. As outlined above, the design should accommodate the largest heavy vehicle types expected on the route. As OSOM operate under permit conditions they may be larger than typical. As such they may impact the functionality of the HVRA (e.g. blocking other HV users from using the site). Consideration should be given to approaches to help mitigate such issues and minimise impacts to other HVRA users. This may include planning to expand the capacity of existing HVRA or for the provision of additional HVRAs (see Section 4.3.1).

4.4.3 Separation of Light and Heavy Vehicles

Separation of light vehicles and heavy vehicles is preferred to promote safety and convenience for users. Clear signage/demarcation should be provided. Where separate parking is provided and, where possible, heavy vehicles should be located at the rear of the HVRA to minimise road noise impacting on driver rest. Further, separation of light and heavy vehicle parking may avoid conflicts during manoeuvring, entering and exiting of the HVRA. Where possible, caravan towing vehicles should be separated from heavy vehicles within the HVRA with designated caravan parking bays that are clearly marked.

4.4.4 Separation of Vehicles Carrying Noisy Freight

Where possible, heavy vehicles carrying noisy freight (e.g. refrigerated goods or livestock) should be separated from other heavy vehicles to minimise noise affecting driver rest.

4.4.5 Separation for Long-term and Short-term Users

Where possible, long-term and short-term users should be separated to increase the amenity and improve traffic flow within the HVRA. Where separated parking is provided, long-term bays should be located at the rear of the HVRA to minimise disruptions to driver rest caused by entering/exiting vehicles.

4.4.6 Unidirectional Flow

A unidirectional vehicle circulation movement should be adopted to minimise the risk of traffic conflicts for vehicles entering and exiting the HVRA.

On freeways and major roads, HVRAs should be provided in pairs or staggered in the direction of approaching traffic to encourage left-in left-out operation, discourage right turns across opposing traffic, and to deter drivers from parking on shoulders and walking across the carriageway.

On remote low-volume routes, paired HVRAs may not be feasible. These should be located such that sight distance is adequate to allow drivers to safely turn right into the facility, and designed to encourage unidirectional flow within the facility.

3 The American Association of State Highway and Transportation Officials (AASHTO) 'system-analysis formula' (AASHTO 2001) may be used to estimate the number of truck and car parking spaces for rest areas. It should be noted that the approach may need to be adapted for the Australian and New Zealand context. See Appendix F.

4.4.7 No Reversing Movements

Heavy vehicle parking spaces should allow for heavy vehicles to enter and leave the parking space in a forward travel direction.

4.4.8 Security

Personal security of HVRA users should be considered in the siting and design of HVRAs. With respect to the different types of HVRAs the following is noted:

- Large facilities (Class 1 and Class 2 HVRAs) will often experience sufficient use to provide a reasonable level of personal security for both car drivers and heavy vehicle drivers.
- Lower-demand HVRAs should be located close to, and within view of, the road so that road traffic can provide a level of security. Where practicable, the landform and landscaping should maintain clear sight lines between the road and HVRA. Careful design of parking space orientation (see Section 4.6.1) can aid in minimising sleep disturbance from headlight glare. HVRAs that are used at night should be provided with suitable lighting, with consideration of potential disturbance by lighting of those attempting to sleep. Where possible, HVRAs should be located within mobile telephone coverage areas to provide additional security for drivers.

The following measures should also be considered to aid security:

- Ensure that the HVRA can be seen by passing motorists. The vegetation between the road and the HVRA, as shown in the schematic in Appendix C, provides a visual separation but should not obscure visual sighting of the HVRA by passing motorists.
- Provide lighting as discussed in Section 4.5.6.
- Provide CCTV and signage highlighting its presence.
- Provide signage with accompanying warnings on the penalties associated with vandalism and encourage people to report illegal behaviour to authorities.
- Maintain the HVRA to a tidy level; a poorly-maintained HVRA may encourage further vandalism and poor user behaviour.
- Design the HVRA for multiple user types to aid in its attractiveness and therefore provide greater security through having more users.

4.4.9 Pedestrian Safety and Access

HVRAs and service centres should be designed to minimise potential conflict between vehicles and pedestrians and ensure that any necessary interaction occurs at a very low speed.

With regard to pedestrian safety, the following layout design principles should be applied:

- Facilities should be located central to the HVRA and/or near the parking spaces. This is to minimise the distance pedestrians are required to walk through the HVRA, thereby minimising the potential for conflict.
- Roadways other than those required for acceleration or deceleration should be designed to restrict vehicles to slow speeds (i.e. a maximum of 20 km/h in parking aisles), rather than simply relying on a speed limit. This could include features such as reduced roadway widths, reduced long, straight lengths, slow points and speed humps. Speed limit signs should be erected at the entrance to Class 1 and Class 2 HVRAs due to their size. Speed limit signs are unlikely to be required at lower-order HVRAs as low speeds should be managed by the physical point of entry.
- Clear sight lines should be provided, based on the design speed for the road section within the HVRA/service centre (refer to Austroads *Guide to Road Design Part 3: Geometric Design* (Austroads 2016) and *Part 4: Intersections and Crossings: General* (Austroads 2017a), and applicable road manager supplements for the geometric design of roads and intersections).

- Where practicable, but certainly at large facilities that are busy at night, areas used by pedestrians should be lit in accordance with jurisdiction's guidelines and AS/NZS 1158 2005-2015 *Lighting for Roads and Public Spaces.* (The provision of lighting is discussed further in Section 4.5.6).
- Where practicable, but often at large and busy facilities, it may be necessary to implement pedestrian facilities in accordance with jurisdiction's guidelines, AS 1742.10:2009, *Pedestrian Control and Protection* and Austroads *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads 2017b). Other pedestrian direction and warning signage may also be of benefit.

4.4.10 Signage on Approach and Within HVRAs

This section discusses the various signage requirements needed to communicate information about HVRAs to drivers. It outlines the minimum signage requirements, signage relating to upcoming HVRAs. ITS and other emerging technologies may also help drivers access information about HVRAs along routes to assist them in their trip planning, including planning for their rests (see Section 5).

Minimum signage requirements

Many jurisdictions currently support HVRA signage in accordance with AS 1742.6:2014 *Manual of Uniform Traffic Control Devices: Tourist and Services Signs*. However, it is noted that some jurisdictions may wish to provide a higher standard of signage (e.g. providing more notice).

HVRAs should be marked by advance signs and position signs as discussed below. These are normally erected on the left side of the carriageway. Care is required in locating signs to ensure that they do not obscure other signs or approaching traffic.

Advance signs and position signs for HVRAs, service centres and information bays should follow the principles of the jurisdiction's guidelines and AS 1742 2007-2018 *Manual of Uniform Traffic Control Devices*.

Advance signs

Advance signs are erected in advance of a HVRA to provide drivers with warning that they are approaching a rest opportunity. Advance signs usually comprise symbols indicating available facilities. They may be supported by the following legend/text/symbols:

- The words 'REST AREA' or 'SERVICE CENTRE' may be added for clarity.
- Where the HVRA is located adjacent to the road – '300 m on LEFT' or '300 m on RIGHT'.
- Where the HVRA is located on a side road – 'TURN LEFT 300 m'.
- The 1 km advance sign with 'LEFT LANE' may be used if drivers could have difficulty weaving into the left lane prior to the ramp.
- The legend '24 hr' should be added if confirmation is needed that the service is continuous.
- For information bays the word 'BAY' is added to the 'i' symbol.
- On rural motorways in flat country the advance sign at 1 km only is usually sufficient for Class 5 HVRAs.

Symbols used on these service signs are listed in Appendix B of AS 1742.6:2014 and contained in road jurisdiction's guidelines.

Position signs

Position signs are located at the junction of the HVRA and the road it serves. They are located either:

- at or directly opposite the point of entry to a service location adjacent to the road
- at the turn-off to services or facilities along a side road/deceleration lane, in conjunction with other intersection direction signs, if any.

Appendix D of AS 1742.6:2014 sets out general principles for the installation and location of HVRA signs. AS 1742.6:2014 distinguishes between non-expressway and expressway HVRAs. Jurisdictional guidelines may also address this area.

Symbols on rest area signage

General rest area – the tree and table symbol (S12 in AS 1742.6, see Figure 4.3) is used to indicate a minimum level general rest area, which may or may not accommodate heavy vehicles. Additional symbols are added to indicate provision of other amenities, such as fireplaces and toilets. AS 1742.6 lists symbols for use on these signs. Where a rest area is not suitable for use by heavy vehicles, the S23 symbol from AS 1742.6 should be used.

General rest area with separated heavy vehicle parking – where a general rest area will also accommodate heavy vehicles, the heavy vehicle parking symbol (S13 in AS 1742.6, see Figure 4.3) is added to the sign.

Exclusive HVRAs – where a rest area is intended only for heavy vehicles, signs should feature only the truck parking symbol (S13 in AS 1742.6).

In the interests of safety and to help drivers plan their rest stops, on major roads, it is recommended that the distance to the next two or three HVRAs be shown on signs located near each HVRA or on departure from towns.

HVRAs on side roads more than 1 km from the turn-off are not usually signed unless they provide other features.

Where a HVRA is located on the opposite side of the road, the HVRA should not be signposted. Instead signage should advise of the next upcoming HVRA located on the left. This is to discourage heavy vehicles from performing a right turn across the opposing flow of traffic. As outlined in Section 4.3.2, where HVRAs cannot be located opposite each other, they should be staggered.

Figure 4.3: Symbols on rest area signage

S12 *S13* *S23* *Example – advance sign with additional symbols for amenities and heavy vehicle parking*

Source: AS 1742.6:2014.

Signage within the HVRA

Within the HVRA, signage may be required to manage speed, separate different vehicle types, control parking, control movements, direct traffic to the ramp re-joining the freeway, or warn drivers of pedestrians or any potential hazards. Signage can also be used to direct pedestrians within the site and help them avoid conflicts with vehicles. The amount and type of signage required will depend on the design, size and complexity of the HVRA.

Signage identifying the HVRA

The HVRA name or number should be displayed on signage within the HVRA so that it may be entered in drivers' work diaries. Road managers are to determine the appropriate naming convention for HVRAs.

The HVRA identifier signage within the HVRA should be clear and in a prominent location (or multiple locations if needed) so that it can be easily seen and read by drivers from all HV parking positions within the HVRA.

Signage relating to upcoming HVRAs

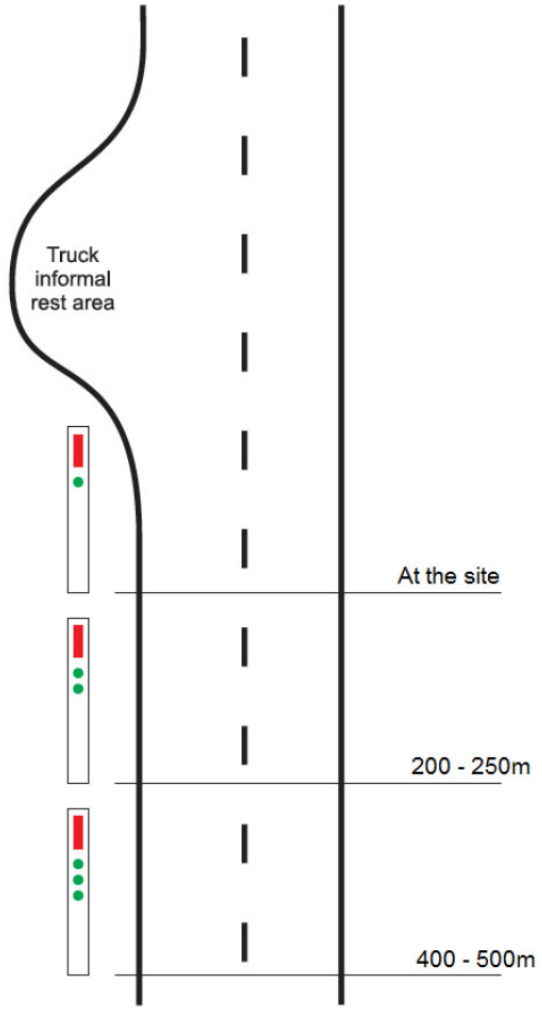
In addition to the 'minimum signage requirements' for advance signs outlined above, the following may also be taken into consideration:

- For Class 1–4 HVRAs, signage should be used to inform drivers of upcoming HVRAs and the available facilities/amenities.
- HVRA signage could be placed in towns and along the route indicating the distance to and between HVRAs or other recognised HV rest opportunities for the upcoming section of freight route.
- The provision of 'distance to next service' information, relating to HVRAs or other rest opportunities should be provided in kilometre units only.

Guidance on the approach to informal HVRAs (3-2-1 Green Reflector Scheme)

Informal HVRAs are not provided by road managers; rather they have evolved through ongoing signs of use by heavy vehicles. The 3-2-1 Green Reflector Scheme may be used to provide notice of informal HVRAs. The reflectors are installed in a 3-2-1 pattern (as shown in Figure 4.4).

Figure 4.4: 3-2-1 guidepost pattern



Source: Roads and Maritime Services (2016).

Sites that have 3-2-1 Green Reflectors must be safe and meet certain requirements. The site requirements are summarised in Table 4.3. Where practicable, informal HVRAs may be considered by road managers for transition to a formal HVRA site at some stage.

4.5 Amenities/Extras

This section provides additional details on the amenities/extras presented in Table 4.1.

Ongoing maintenance requirements need to be considered when considering the inclusion of amenities and other extra features to be provided. As such, amenities/extras should only be provided if they can be reasonably maintained. Refer to Section 4.6.3 for further discussion on the ongoing maintenance issues of HVRAs including the provision of amenities/extras.

4.5.1 All-weather Seal

Sealed pavements for ingress/egress are highly desirable for all HVRA types. See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.2 Tables/Benches

The provision of tables and benches may encourage drivers to leave their vehicle to rest. The quantity and type of such facilities will vary based upon the type of HVRA and likely peak vehicle usage.

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.3 Natural Shade

Where possible, natural shade should be provided using trees. It is preferable to locate the natural shade where the cab of the vehicle will park and at locations frequented by vehicles transporting livestock. Where natural shade already exists, the facility should be designed around it as far as practicable. Where natural shade cannot be provided, shelters should be considered (see Section 4.5.4).

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.4 Shelter

The installation of shelters that protect users from both sun and rain should be considered in the HVRA design, with consideration given to installation and maintenance costs along with the type of HVRA and peak vehicle usage. Shelters with a clearance of at least 5 m should be provided in areas where natural shade is not possible over the cab of the vehicle and at locations frequented by vehicles transporting livestock.

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.5 Rubbish Bins

Provision of appropriately-sized bins in HVRAs is desirable (preferably with lids that close quietly, minimising disruptions of sleep due to noise, and also discouraging animals getting access). These bins should be clearly visible (both from within the HVRA and from passing motorists), easily accessible (this includes the number provided within the HVRA and the spacing between them on the HVRA site so that they are all easily accessible (e.g. short 10 m walk) to all users of the HVRA regardless of where they park) and serviced regularly. The ability to maintain these, especially in remote locations, should be considered.

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.6 Lighting

Lighting should be provided in accordance with jurisdiction's guidelines for designated Class 1 to Class 4 HVRAs.

In general, lighting of access roads and parking areas should be aligned in accordance with AS/NZS 1158:2005-2015. Consideration should be given to the provision and placement of lighting to enhance the safety and security of the HVRAs but not detract from sleeping.

Lighting requirements should be considered on a site-by-site basis, considering the different lighting needs of access points (access ramps, entrance and exit points, etc.) and illumination within the HVRA (e.g. illumination of walkways, parking bays and building approaches and other features of larger HVRA). Further, consideration should be given to the anticipated demand for the HVRA, the type of traffic frequenting it and the time of day it is likely to be used. Where vehicle assembly and disassembly operations take place and for reasons of personal safety, lighting should be provided.

Other issues for consideration include lighting maintenance, light spill into adjacent properties, glare and sky glow and power supply (e.g. solar power for remote locations or to reduce operating costs where feasible).

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.7 Toilets

Toilets should be provided at all designated Class 1 HVRAs, with the provision of toilets at other classes of facility influenced by AADT, alternative opportunities (such as the proximity of towns) and motorist needs as well as the feasibility of installation. Composting or pit toilets could be considered where the supply of water creates difficulties. Consideration should be given to the estimated use and cost of maintenance and cleaning.

It is noted that there is a growing number of female drivers in the heavy vehicle industry; this should also be considered in the design of HVRAs. Consideration should be given to whether the dynamics are such that separate male and female toilets are required or if a unisex toilet is sufficient. Engagement with the local heavy vehicle industry for which an HVRA is provided may be helpful in understanding the dynamics.

Consideration should also be given to providing showers as part of the toilet facilities where it is viable to provide and maintain the operation of the shower (including provision of water).

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.8 Water

Drinking water facilities should be provided, taking into consideration the estimated use and cost of maintenance and cleaning.

See Section 4.6.3 for discussion on ongoing maintenance considerations, including issues relating to access to potable water.

4.5.9 Visitor Information Board

Visitor information boards may be used to support local tourism and contain information regarding distance to the next town, amenity or HVRA.

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.5.10 Managed Livestock Effluent Disposal Sites

The livestock transport industry needs to make provision for the disposal of livestock effluent at HVRAs, in accordance with local health and environmental requirements. This should be considered in the design of an HVRA where livestock traffic is expected, but in some instances, it may be more appropriate to locate it at a separate facility nearby, so that it does not affect the amenity of the HVRA. Design considerations include how the livestock vehicle is to dispose of the effluent, how the effluent will be stored at the site (in accordance with local health and environmental requirements) and how the maintenance vehicles will remove the effluent. The intervals for removing the effluent should consider the frequency of livestock vehicle usage of the site. The need for such facilities will be derived from the number of livestock vehicles utilising the HVRA, and the maintenance requirement.

See Section 4.6.3 for discussion on ongoing maintenance considerations.

4.6 Additional Issues

This section discusses additional issues associated with HVRAs that should be considered in their planning and design.

4.6.1 Parking Bay Orientation

Parallel parking (against a kerb) is preferred for long-term (sleep) rest as noise impacts from directly adjacent vehicles are typically less than are experienced with herringbone parking configurations. It also offers the opportunity to provide shade to parked heavy vehicles. A herringbone parking configuration may be provided for short-term rest. Where a herringbone parking layout is considered for long-term rest, consideration should also be given to providing buffers or screening between parking spaces to help mitigate potential noise and light issues.

Where possible, heavy vehicle parking bays should be orientated away from the adjoining highway to eliminate headlight glare entering cabins (as this may impact on driver rest).

Where possible, consideration should be given to the path of the sun so that the parking bays can be orientated, and shade provided where possible to protect the cabins from overheating when drivers are resting. A focus should be on providing shade during the middle of the day.

4.6.2 Providing for People with a Disability or Mobility Difficulty

HVRA Strategy Plans should ensure all new or upgraded HVRAs are built in accordance with the *Disability Discrimination Act, 1992 (Cth)* providing appropriate facilities and access requirements.

4.6.3 Ongoing Maintenance

Ongoing maintenance costs must be considered by road managers when designing HVRAs. Costs associated with planning, initial investment and maintenance costs of each HVRA will be related to the sophistication and Class of the HVRA. To assist state road managers in undertaking their maintenance programs for HVRAs along state-controlled roads, consideration should be given to partnering with local governments on maintenance programs/monitoring, including reporting of site conditions.

Water

There may be circumstances where access to potable piped water is limited. In these situations, consideration should be given to the provision of potable water storage facilities and the implications for maintenance of adequate potable water supplies in the storage facility. Water storage facilities should be provided and designed such that adequate levels of water can be reasonably maintained.

Amenities and facilities

Amenities and facilities should only be provided if they can be reasonably maintained. The types of amenities or facilities should be fit-for-purpose and influenced by the busyness and serviceability of the HVRA. Consideration should be given to the following:

- Toilets require cleaning (potentially frequently). A flushable toilet may require more frequent cleaning as user expectations may be higher, compared with long-drop toilets which may require less frequent cleaning. Composting or pit toilets may be more suitable on lower volume routes.
- Rubbish bins require emptying. Smaller bins will require more frequent emptying and maintenance than larger bins.
- Building materials that require low maintenance and are resistant to graffiti and other vandalism.

Vandalism and rubbish

Poor user behaviour (rubbish dumping, vandalism of assets such as tables, toilets, lighting, shelters and visitor information boards) also contributes to ongoing maintenance issues. The provision of sophisticated HVRAs and amenities will typically increase maintenance demands. High demand HVRAs, visibility from the road or proximity to local towns/businesses may reduce the likelihood of poor user behaviour. Where vandalism is considered a risk, showers and toilets can be equipped to allow unlocking through a mobile phone app.

Consideration may be given to installing mesh boundary fencing to capture and limit rubbish being blown into adjoining properties.

All-weather seal

It is noted that all-weather sealed pavements for ingress/egress are highly desirable for all HVRA types. Consideration should be given to pavements that can accommodate the heaviest vehicles that will utilise the HVRA (area and depth, surfacing type) including acceleration and deceleration facilities and proper design using turn paths for relevant vehicles so kerbs are not clipped/damaged and the surfacing not destroyed by turning/braking movements. Pavement selection (sealed or unsealed) should consider:

- amenity and safety
- construction and ongoing maintenance cost.

Shade

Provision of natural shade may result in a maintenance obligation to ensure that the vegetation is safe and suitable for the rest area (e.g. arborist assessment of the tree).

Visitor information

Visitor information boards should be updated on a semi-regular basis to maintain their currency. This maintains the integrity of the visitor information board both at the HVRA site and at others.

Livestock

Provision for managed facilities to dispose of livestock effluent would require consideration of how effluent would be stored in accordance with local health and environmental requirements (given the demand and frequency of removal) and later removed (frequency of the removal) to minimise impacting on the amenity of the HVRA.

4.6.4 Ensuring Availability of HVRAs for Heavy Vehicle Drivers

HVRAs should remain open always unless there is direct work to be undertaken on them. HVRAs should not be closed to store materials for nearby roadworks. Where a HVRA is closed, this should be communicated to the heavy vehicle industry well in advance so that they can develop strategies to address this.

4.6.5 Provision for Coupling and Decoupling

Where required (e.g. on the approach to towns or key exchange areas), provision for coupling and decoupling should be accommodated; however, these should be located adjacent to the HVRA rather than within it. Keeping coupling and decoupling areas separate from the HVRA should prevent decoupled trailers taking up space intended to be used for heavy vehicle parking while drivers are resting.

4.6.6 Use of HVRAs by Light Vehicle Drivers

Use of designated HVRAs by drivers of light vehicles should be prohibited or limited to ensure adequate facilities and capacity are available to accommodate heavy vehicle drivers' needs. However, the use of HVRAs by light vehicle drivers suffering from fatigue should be allowed where it can be catered for. As outlined in these Guidelines, HVRAs should cater for light vehicle drivers through separation of the respective designated parking. Light vehicles should be prohibited from parking in designated heavy vehicle parking spaces to ensure sufficient capacity for heavy vehicle drivers as well as avoiding disturbance due to excessive noise. The separate parking areas should be signposted and enforced.

Camping in designated HVRAs by light vehicle drivers should be prohibited. Road managers should encourage light vehicle drivers to seek alternative overnight options when planning overnight stops, such as commercial options or designated camping areas. A maximum length of stay should be implemented to prevent the light vehicle rest area becoming full and tempting use of a nearby HVRA.

While ensuring adequate facilities and capacity are available to accommodate heavy vehicle drivers' needs is critical, road managers need to be mindful of minimising fatigue for all drivers. Where suitable alternative options are not available, it is preferable for fatigued drivers to sleep in their cars or attached caravans, rather than continuing a journey. Therefore, conditions for use of HVRAs should stipulate which vehicles may use HVRAs and requirements to which they must adhere. This may include:

- light vehicles must use allocated spaces
- caravans must remain attached to towing vehicles
- no awnings may be erected or chairs set out
- no generators may be used or solar power units set up
- no tents allowed.

Road managers should consider the penalties and enforcement options to discourage camping to maintain the HVRAs in a suitable condition (with adequate available heavy vehicle parking capacity) so that it achieves its primary function of facilitating rest for heavy vehicle drivers, and to support drivers' compliance with the heavy vehicle national law.

In addition, light vehicle drivers, especially those towing caravans or camper trailers, should be educated on appropriate use of HVRAs. Appendix B provides an example of one such initiative.

4.6.7 Cross-border Compatibility

It is recommended that road managers adopt common guidelines for the provision of HVRAs and coordinate their provision across borders, so that a consistent level of service is provided along important routes. Coordination across borders will also avoid issues such as duplication of facilities (which may lead to under-utilisation of one or both facilities and may adversely affect their viability).

It is desirable that travellers and heavy vehicle drivers using an important route are provided with a consistent level of service along the route. This creates a situation where drivers using a route become aware of the level of opportunity afforded by HVRAs and can plan a stop with confidence when they begin to feel tired. Important routes often cross borders and it is desirable that the opportunities for rest do not diminish abruptly as drivers travel along a route.

4.6.8 Consideration for Future Demands

Future capacity

HVRA size and location should be periodically checked against any future planning proposals and the projected increase in freight task along the route. This would involve assessing the capacity of the HVRA and its capability to meet current and future demands. Factors that should be considered when assessing capacity include length of stay, number of heavy and light vehicles using the HVRA, seasonal variation in demand, different types of heavy vehicles and different freight types (e.g. semi-trailers, B-Doubles, refrigerated, livestock, etc.).

Assumptions used in determining HVRA size and capacity have an effect on planning outcomes and subsequent planning decisions. Without consideration of the projected freight task, premature or excessive capital works investment may result in unnecessary expenditure and use of resources. Conversely, inadequate demand management and/or infrastructure investment may result in drivers not being able to rest when needed, or complaints about inadequate facilities.

The HVRA design adopted by road managers should take into consideration where nearby HVRAs may be provided, or how the proposed HVRA may be expanded should its capacity fail to meet demand. As such, some future-proofing should be considered in the layout and placement of HVRAs. This includes taking into consideration potential future expansion needs. Section 3 provides guidance on the steps required to identify needs for expansion of existing or development of new HVRAs.

Future amenities and facilities

Consideration may be given to future amenities and facilities that would benefit HVRA users. This includes other road users where the HVRA caters for that use, e.g. electric vehicle charging stations.

4.6.9 Dangerous Goods Vehicles

A road vehicle ‘transporting dangerous goods must not be parked or left standing within 8 metres of another vehicle which is transporting placarded dangerous goods’ (National Transport Commission 2018). Road managers should consider this requirement during the planning and design of HVRAs by ensuring that either:

- The number of parking spaces provided is sufficient to accommodate the actual and forecasted HV demand, and that there are enough parking spaces to enable dangerous goods vehicles to park in accordance with the 8 metre requirement.
- The spacing between HVRAs enables a dangerous goods vehicle to travel to an alternative facility, if the initial HVRA does not accommodate an additional dangerous goods vehicle to park in accordance with the 8 metre requirement.

Road managers and industry are encouraged to liaise together to identify locations where compliance with the 8 metres requirement, as outlined above, is an issue and where consideration of the above points needs to be applied.

5. Communicating Rest Opportunities to Drivers

Information about the HVRA network needs to be available to heavy vehicle drivers to assist them in their trip planning, including planning for their rests. This should be considered in the overall planning of a jurisdiction's HVRA strategy. Section 4.4.10 discusses signage requirements alerting drivers on approach to HVRAs, guiding them to HVRA entrances and managing the use of the HVRAs. ITS and other emerging technologies may also help drivers access information about HVRAs along routes to assist them in their trip planning, including planning for their rests.

The integration of emerging technologies and ITS may support the use and increase awareness of HVRAs by providing drivers with live information about HVRA locations, the distance and estimated travel time to reach them and the facilities available. Emerging technologies that may have application to HVRAs in the future include the following:

- In-vehicle tools that advise heavy vehicle drivers about HVRA locations, occupancy and facilities.
  - It is noted that Transport Certification Australia (TCA) is working on a way to make HVRA information available for use in GPS systems. Refer to Appendix E.
  - In addition, road managers should consider working with other jurisdictions and telematic device (including navigation devices) providers to develop a data standard and consider establishing a data portal for the provision of HVRA facility information in addition to other truck related information. This would allow HVRA information to be made available for use in GPS systems and Electronic Work Diaries.
- Interactive online maps that allows drivers to find HVRAs based upon location and amenities (Roads and Maritime Services (2018) and VicRoads (2016) currently provide these types of maps). This could be linked to NHVR's online journey planner.
- Mobile phone apps that enable drivers to access information about HVRAs along routes to assist them in their route planning, including planning for their rests.

It is noted that the VicRoads TRAVIS project, a jointly funded State and Federal Government project, aims to utilise ITS to provide real time heavy vehicle parking vacancy information on advanced signage to support drivers to make better decisions regarding rest. The system also aims to share information about HVRA capacity with nearby facilities (Benjamin & Polley 2015).

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Appendix A Gippsland Safe Freight Network

It is recommended that road managers work with drivers, operators and local government to provide a network approach to road safety. An example of this is the Gippsland Safe Freight Network.

The Gippsland Safe Freight Network is a collaboration of drivers, owners, government agencies and local councils which have been working together to identify and address specific transport safety concerns. The initiative resulted in the following conclusions (National Road Safety Partnership Program 2017):

- Create regional networks that involve drivers, owners and government agencies which successfully address specific transport safety issues within those regions.
- Actions need to be informed by crash data and other relevant research to ensure responses are effective in addressing what is happening on the ground.
- Often drivers and operators are not involved in discussions about safety; involving those at the frontline increases engagement and the practicality of outputs.
- The first step in establishing an effective network is developing a contact list that ensures all stakeholders are involved, including all local industries, government agencies and local road safety experts.
- The success of the network approach rests on targeting specific regional areas and issues, sharing information and the willingness of participants to engage with the process, something they are more likely to do if they feel their input is valued.

The initiative is considered so successful in Gippsland that it is being rolled out nationally.

Appendix B NHVR Heavy Vehicle Safety Initiative

The Heavy Vehicle Safety Initiative program is to support projects that deliver tangible improvements in heavy vehicle safety (National Heavy Vehicle Regulator 2017). Guiding principles for projects include:

1. Be able to align with heavy vehicle and road safety priorities.
2. Be able to be completed within three years.
3. Be able to provide evidence demonstrating how the project will help achieve heavy vehicle safety outcomes.
4. Be able to provide broad benefits across jurisdictions.
5. Be able to provide holistic solutions to current problems.
6. Be able to represent value for money.

Relevant to these Guidelines is that the NHVR is, as at the time of preparation of this document, funding under the Heavy Vehicle Safety Initiative a project by the Caravan Industry Association of Australia to inform caravan and recreational vehicle travellers on the appropriate use of HVRA and the risks associated with disruptive behaviour. This and other educational campaigns can help inform appropriate use of HVRAs by light vehicle drivers and foster a safer environment for all road users.

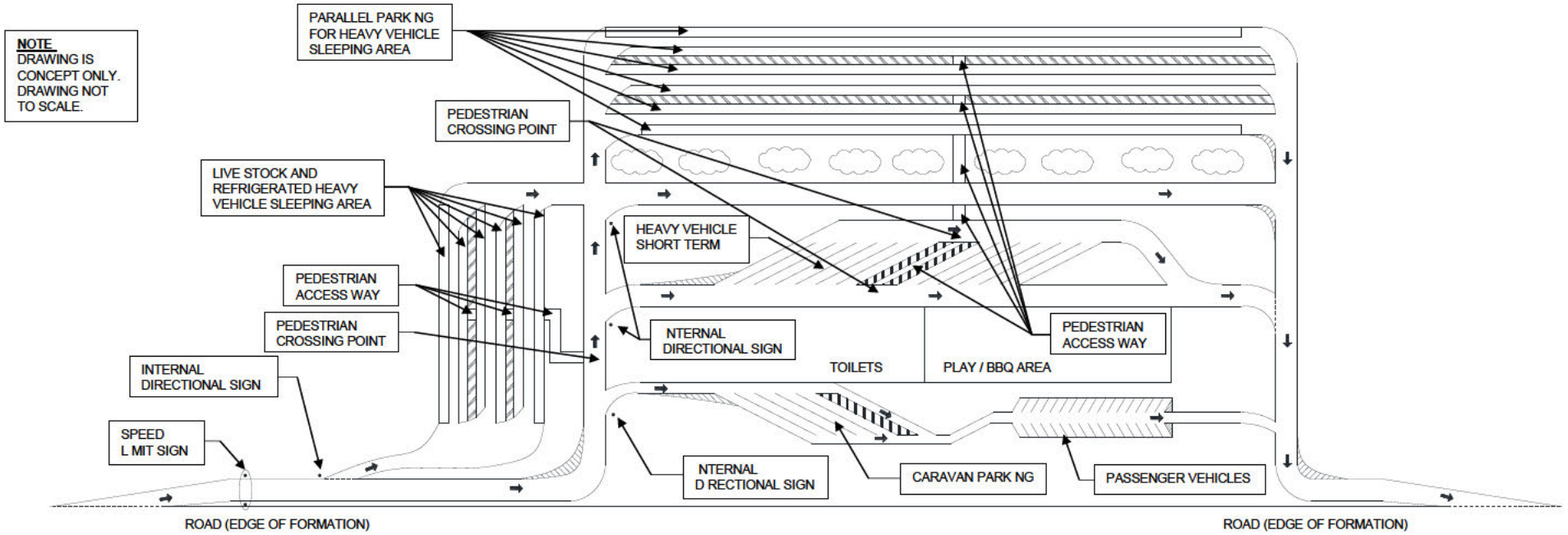
Appendix C HVRA Layout Schematics

This appendix presents schematic concept design drawings only. Actual designs need to take into consideration a range of site-specific issues as outlined in Section 4 of these Guidelines.

The HVRA shown in this appendix are as follows:

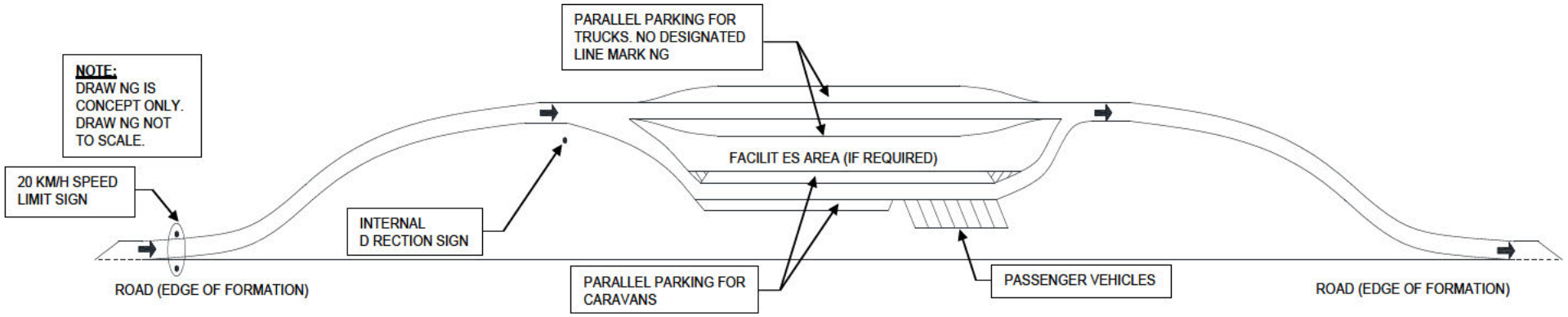
- Class 1 HVRA: Appendix C.1
- Class 2 HVRA: Appendix C.2
- Class 3 and 4 HVRA: Appendix C.3
- Class 5 HVRA: Appendix C.4
- Informal HVRA: Appendix C.5.

C.1 Class 1 HVRA



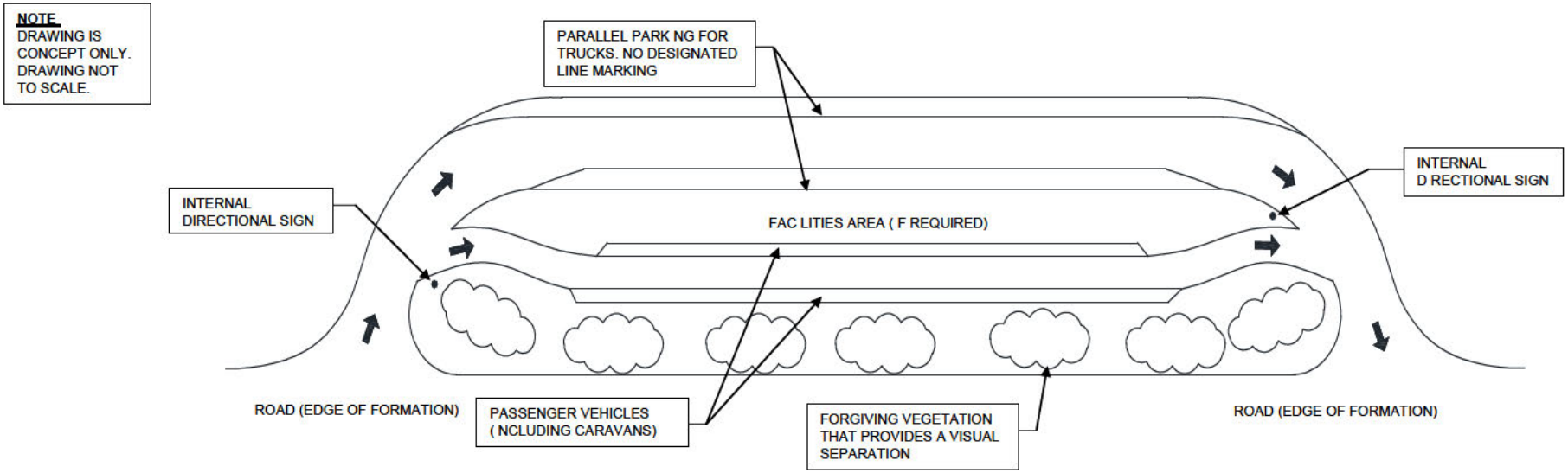
Note: This diagram is indicative only. The layout and size will need to be determined based on a range of site specific issues as outlined in Section 4 of these Guidelines in particular the number and type of the various heavy vehicles anticipated to use the HVRA now and in the future (giving consideration to future demands as outlined in Section 4.6.8). Consideration should also be given to the number of other potential vehicles using the HVRA.

C.2 Class 2 HVRA



Note: This diagram is indicative only. The layout and size will need to be determined based on a range of site specific issues as outlined in Section 4 of these Guidelines in particular the number and type of the various heavy vehicles anticipated to use the HVRA now and in the future (giving consideration to future demands as outlined in Section 4.6.8). Consideration should also be given to the number of other potential vehicles using the HVRA.

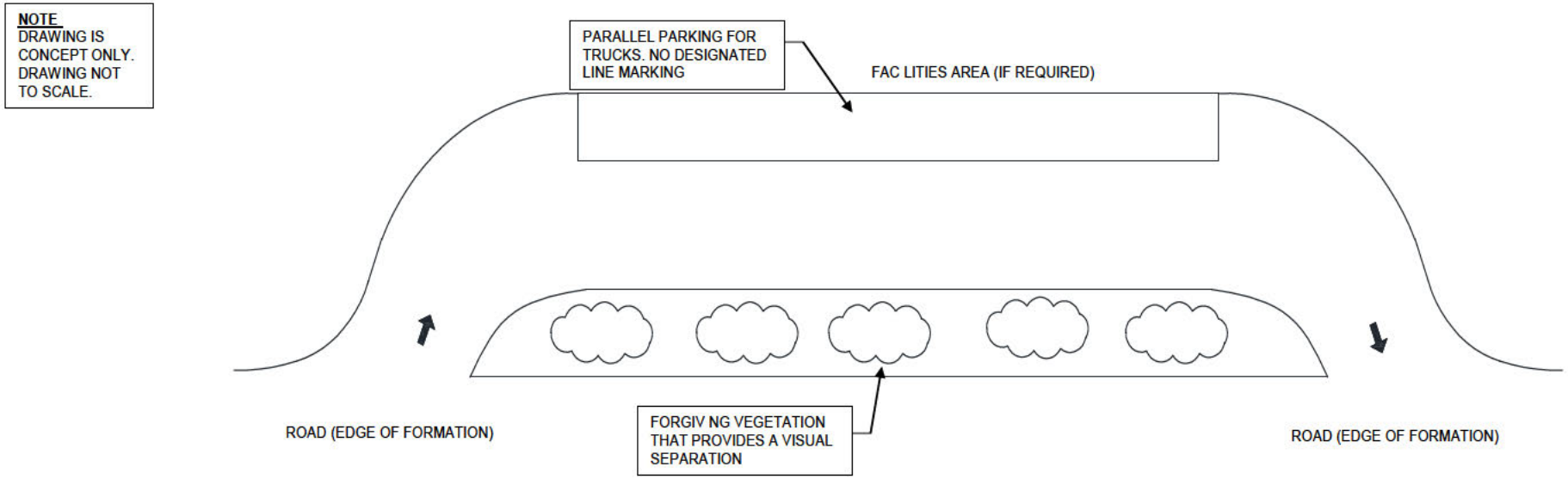
C.3 Class 3 and 4 HVRA



Notes:

- *This diagram is indicative only. The layout and size will need to be determined based on a range of site-specific issues as outlined in Section 4 of these Guidelines in particular the number and type of the various heavy vehicles anticipated to use the HVRA now and in the future (giving consideration to future demands as outlined in Section 4.6.8). Consideration should also be given to the number of other potential vehicles using the HVRA.*
- *Speed limit signs are not required as speed should be controlled by the physical point of entry.*

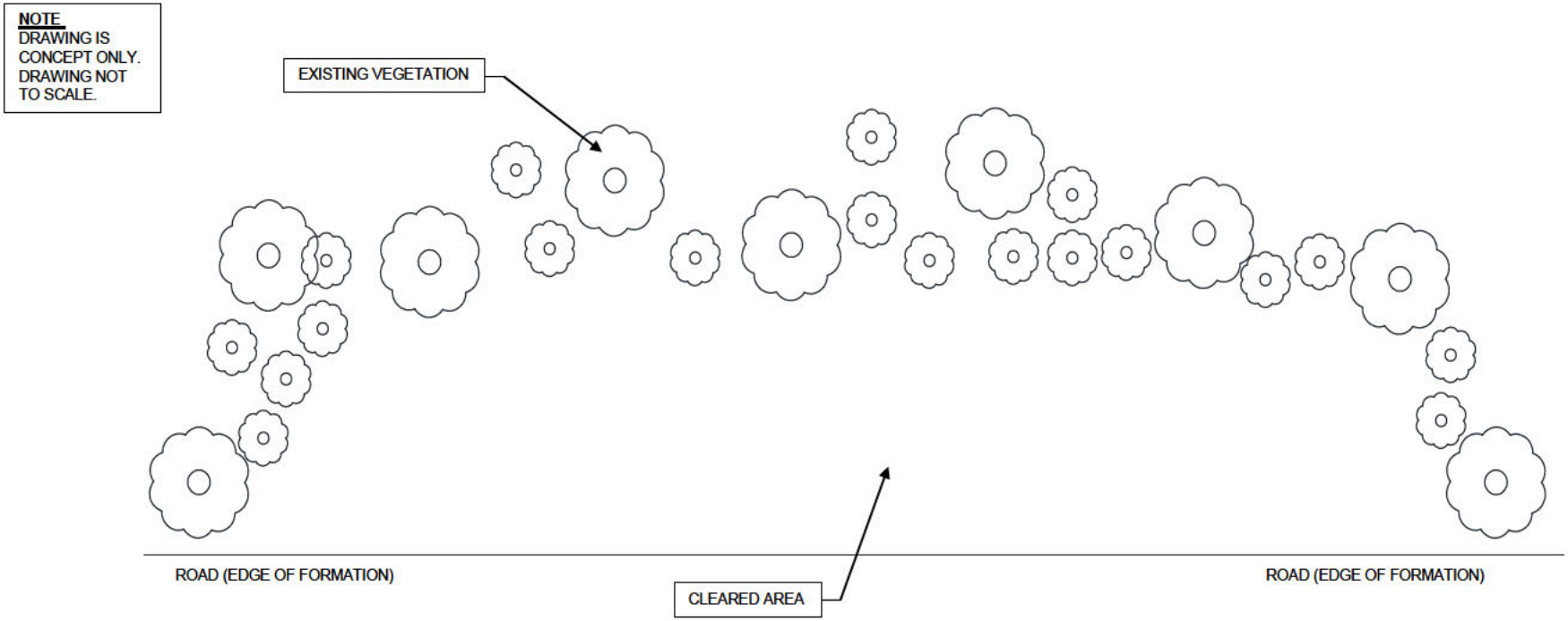
C.4 Class 5 HVRA



Notes:

- *This diagram is indicative only. The layout and size will need to be determined based on a range of site-specific issues as outlined in Section 4 of these Guidelines in particular the number and type of the various heavy vehicles anticipated to use the HVRA now and in the future (giving consideration to future demands as outlined in Section 4.6.8). Consideration should also be given to the number of other potential vehicles using the HVRA.*
- *Speed limit signs are not required as speed should be controlled by the physical point of entry.*

C.5 Informal HVRA



Notes:

- *This diagram is indicative only. The layout and size will need to be determined based on a range of site-specific issues as outlined in Section 4 of these Guidelines in particular the number and type of the various heavy vehicles anticipated to use the HVRA now and in the future (giving consideration to future demands as outlined in Section 4.6.8). Consideration should also be given to the number of other potential vehicles using the HVRA.*
- *Speed limit signs are not required as speed should be controlled by the physical point of entry.*

Appendix D Assessing Heavy Vehicle Crash Rates

This appendix presents a method for comparing heavy vehicle crash rates and overall crash rates, taking into account the proportion of heavy vehicle traffic on the route in question in comparison with the whole network. This method may be used where an agency does not have an established method of determining whether heavy vehicle crashes are over-represented on a given route.

Step 1 $$HV\%_{network} = \frac{ADT_{HV\ network}}{ADT_{total\ network}}$$ A1

Step 2 $$HV\%_{route} = \frac{ADT_{HV\ route}}{ADT_{total\ route}}$$ A2

Step 3 $$f_{HV} = \frac{HV\%_{route}}{HV\%_{network}}$$ A3

Step 4 $$HVcrash\%_{route} = \frac{crashes_{HV\ route}}{crashes_{total\ route}}$$ A4

Step 5 $$HVcrash\%_{network} = \frac{crashes_{HV\ network}}{crashes_{total\ network}}$$ A5

Step 6 $$c_{HV} = \frac{HVcrash\%_{route}}{HVcrash\%_{network}}$$ A6

where

$HV\%_{network}$	=	Proportion of all network traffic made up of heavy vehicles
$HV\%_{route}$	=	Proportion of traffic on this route or road that is made up of heavy vehicles
f_{HV}	=	Heavy vehicle concentration on this route or road in comparison with concentration on the whole network
$HVcrash\%_{route}$	=	Proportion of crashes on this route or road that is made up of heavy vehicle crashes
$HVcrash\%_{network}$	=	Proportion of crashes on the whole network that is made up of heavy vehicle crashes
c_{HV}	=	Heavy vehicle crash proportion on this route or road as a fraction of the heavy vehicle crash proportion on the whole network
$ADT_{HV\ network}$	=	Average daily heavy vehicle traffic on the whole network

$ADT_{total\ network}$ = Average daily traffic on the whole network

$ADT_{HV\ route}$ = Average daily heavy vehicle traffic on this route or road

$ADT_{total\ route}$ = Average daily traffic on this route or road

$crashes_{HV\ oute}$ = Number of heavy vehicle crashes on this route or road

$crashes_{total\ route}$ = Number of crashes on this route or road

$crashes_{HV\ network}$ = Number of heavy vehicle crashes on the whole network

$crashes_{total\ network}$ = Number of crashes on the whole network

Step 7 Following completion of Steps 1–6 above, c_{HV} and f_{HV} are compared to determine whether the heavy vehicle crash rate may be considered high, average or low on a given route. i.e.:

If c_{HV}>f_{HV}, crash rates are high

If c_{HV}=f_{HV}, crash rates are average

If c_{HV}<f_{HV}, crash rates are low

Appendix E TCA Mapping of HVRAs

Transport Certification Australia (TCA) is working on a way to make HVRA information available for use in GPS systems.

In conjunction with road and transport agencies, a national data set for rest area information will include:

- location coordinates
- the number and size of vehicles which can be accommodated at each location
- occupancy/availability of rest bays (if available).

Rest area information will be made available through the new Traveller Information Exchange.

Appendix F Estimating Parking Spaces

Past research and guidelines from the United States may inform Australian heavy vehicle rest area investment and needs prioritisation models. The AASHTO 'system-analysis formula' presented in this appendix provides a method that may be used to estimate the number of truck and car parking spaces (Equation A7 and Equation A8). It should be noted that the approach may need to be adapted for the Australian and New Zealand context.

Factors in the equations will be influenced by:

- length of stay (considered during assessment of existing rest areas)
- proportion of cars and heavy vehicles using rest area
- whether capacity will be sufficient for seasonal variations and projected growth in traffic volumes (and therefore expected greater demand for use of rest area); the peak factor (PF) should account for seasonal variations, while the anticipated future demand (capacity required) can be estimated by using projected future traffic volumes in the model
- heavy vehicle types which influence the type/size of spaces (considered during assessment of existing rest areas).

System-analysis formula

$$N_c = \frac{ADT \times P \times DH \times D_c \times PF \times VHS}{60\ min.} \quad \text{A7}$$

and

$$N_t = \frac{ADT \times P \times DH \times D_t \times PF \times VHS}{60\ min.} \quad \text{A8}$$

where

N_c = Number of car parking spaces required

N_t = Number of truck parking spaces required

ADT = Average Daily Traffic: total volume of vehicle traffic averaged over the data collection period (e.g. a week or a month)

Note, if Annual Average Daily Traffic (AADT) is available, it is recommended that this figure be used. It is recommended that one-way ADT data is used (as it is generally recommended, where possible, that rest areas be provided on both sides of the road)

P = Proportion of mainline traffic stopping x DSL/BSL (the adjusted proportion of mainline stopping in the overall corridor), established on a case-by-case basis by usage surveys

The adjusted proportion of traffic that stops, i.e. proportion of (mainline) traffic that stops x DSL/BSL (see definitions below):

- Mainline traffic: traffic on the main lanes of a roadway (i.e. excluding off-ramps or exit lanes)
- DSL = Design Section Length: length of the route section being assessed
- BSL = Base Section Length: the base spacing interval, generally 100 km (as this enables comparison with other section lengths)

Note however, an assumed value of P can be adopted. The default value of P is 0.12, which is adjusted (+ 0.01) for each applicable factor from Table E 1

DH = Design hourly factor (DHV/ADT)

The design hour factor (sometimes represented as K30) is the relationship between the 30th highest hour volume and the AADT for the design year (calculated as DHV/ADT):

- DHV = design hourly volume is typically the 30th highest hourly traffic volume for the design year (generally 20 years after construction)

Note, however, an assumed value of DH can be adopted (see Table E 2)

D_c = Percentage of cars using the facility, normally assumed to be 0.75 (unless a specific site survey indicates using a different factor)

D_t = Percentage of heavy trucks using the facility, normally assumed to be 0.25 (unless a specific site survey indicates using a different factor)

PF = Peak factor, the ratio of average day usage during the five summer months to average day usage over the entire year, normally assumed to be 1.8

VHS = Average length of stay for trucks determined on an hourly basis, normally assumed to be 15 minutes for cars and 20 minutes for trucks

Source: AASHTO (2001).

Table E 1: Recommended P adjustment values

Factor	Description	Comment (for Australian and NZ context)	Adjustment
Distance from previous rest area	If distance from previous rest area exceeds 50 miles	50 miles is approximately 80 km	+ 0.01
Distance to next interchange	If distance to next interchange exceeds 10 miles	10 miles is approximately 16 km	+ 0.01
Welcome centre[1]	If rest area is a welcome centre	Comparable to a rest area that is popular with road users due to a high level of available amenities or nearby points of interest	+ 0.01
Type of truck parking spaces at the rest area	If truck parking spaces are diagonal pull-through type	Availability of drive-through parking spaces for heavy vehicles (angled or end-to-end)[3]	+ 0.01
Rest area food facilities	If food facilities are available (e.g. restaurant, take-away or vending)		+ 0.01
Rest area lighting	If lighting is considered adequate[2]		+ 0.01
Availability of rest area attendant	If an attendant is available on rest-area premises	Comparable to towns/commercial centres where retail outlets are available (such as petrol and/or food)	+ 0.01

1 *A welcome center is a rest area with additional amenities including tourist information (AASHTO 2009).*
2 *'Adequate lighting' can be based on survey of truck driver, or qualitative judgement (AASHTO 2001).*
3 *Angled parking allows easier maneuverability into or out of parking spaces. Feedback from industry representatives at the project workshop indicated that drivers preferred end-to-end parking, to facilitate better rest, particularly for long stays. An end-to-end arrangement means that cabins are further away from other trucks compared to an angled parking arrangement. Where possible, consideration may also be given to configurations that allow north/south parking orientation rather than east/west, as this reduces the impact of the sun and may assist in better quality rest.*

Source: Based on AASHTO (2001) (Decision rule 1, p 109–112). Column 'Comment (for Australian and NZ context)' has been added.

Table E 2: Recommended design hour factor

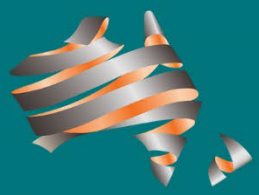
AADT	DH factor
AADT < 12 500	0.15
12 500 < AADT < 30 000	0.1
AADT > 30 000	0.075

Source: Based on AASHTO (2001) (Decision rule 2, p 113).

Glossary

The terms in this Glossary are provided in the context of HVRAs rather than generic terms as defined in the Austroads Glossary of Terms.

Term	Description
Capacity	The capacity of a HVRA is the number of parking spaces available, for heavy and/or light vehicles). Factors that should be considered when assessing capacity include length of stay, number of heavy and light vehicles using the HVRA, demand (see below), different types of heavy vehicles and different freight types (e.g. semi-trailers, B-Doubles, refrigerated, livestock, etc.). The American Association of State Highway and Transportation Officials (AASHTO) 'system-analysis formula' (AASHTO 2001) may be used to estimate the number of truck and car parking spaces for rest areas. It should be noted that the approach may need to be adapted for the Australian and New Zealand context.
Demand	The demand of a HVRA is the required number of parking spaces. Demand should be a measure of the peak demand (i.e. accounting for daily and seasonal variations).
Fatigue	Fatigue covers a wide range of characteristics, including sleepiness, drowsiness and feeling tired or weary. Each outcome has its own causes, symptoms and treatments.
Freight route	Designated routes that provide access for road freight between freight generating and receiving areas. The Austroads' Guideline for Freight Routes in Urban and Rural Areas (Austroads 2007) identifies the following: • Major freight routes are roads that experience high daily volumes of heavy vehicles. 'In urban areas they consist of motorways and major roads that provide connections between freight significant generating/receiving areas'. In rural areas they include roads incorporated under the AusLink Land Transport Network (ALTN) as well as routes identified by state and local governments. • High wide load routes provide access to restricted access vehicles. High wide load routes are also known as Oversize/Overmass (OSOM) routes. Commodity routes provide access for freight at certain times of the year, for instance to accommodate seasonal demands.
Formal HVRA	Formal HVRAs are HVRAs which are provided/maintained by the road manager to support the heavy vehicle industry to comply with the fatigue regulations. There are five classes of formal HVRA. Decisions on the appropriate class of HVRA to install and where and how frequently to install HVRAs is up to the road manager. These Guidelines aim to assist this decision-making process.
HV	Heavy vehicle
HVRA(s)	Heavy Vehicle Rest Area(s). HVRAs provide an opportunity for drivers to sleep and take rest breaks (helping them manage fatigue and comply with driving hours regulations) and enable drivers to check their vehicles and loads. Facilities and amenities provided at HVRAs vary depending on the type of HVRA. Some HVRAs cater specifically for heavy vehicle drivers; while some provide separate parking for heavy and light vehicles.
HVRA class	This Guideline identifies five formal HVRA classes and one informal HVRA class. The classes vary based on capacity, facilities and amenities provided.
HV rest opportunity	An opportunity for heavy vehicle driver rest that may not be a formal HVRA or informal HVRA. Where they are approved by the operator or the local government responsible examples of HV rest opportunities include commercial facilities (including service centres and roadhouses) and in town facilities.
Informal HVRA	Informal HVRAs are not provided/maintained by the road manager, rather they have evolved through obvious signs of use by Heavy vehicles. Informal HVRAs may supplement the existing formal HVRA network. Therefore, it is important for road managers to consider the location of informal HVRAs when considering rest opportunities along a route. An informal HVRA may be upgraded to a formal HVRA should the location prove valuable.
LV	Light vehicle
OSOM	Oversize/Overmass. This refers to a vehicle with a special permit due to it exceeding normal permitted heavy vehicle size or mass.
Road manager	National or state road agency, municipality, other body or individual responsible for the care, control and maintenance of road infrastructure.



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2010 – 2016

Regional Stock Truck Effluent Strategy for the Waikato region

Environment Waikato
REGIONAL COUNCIL

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Contents

Chairman's foreword 3

Glossary of terms 4

Executive summary 5

1 Background and development of strategy 7
1.1 Introduction 9
1.2 Purpose 9
1.3 Why stock truck effluent is a problem 9
1.4 Roles and responsibilities 10
1.5 Strategy structure 11
1.6 Strategy preparation process 11
1.7 Legislative and policy context 13

2 Stock truck effluent in the Waikato region 15
2.1 Background 17
2.2 Effects of stock truck effluent spillage 19
2.3 Key issues 22

3 Vision, objectives, policies, implementation actions and outcomes 31
3.1 Vision 33
3.2 Objectives 33
3.3 Policies and actions 35

Targets, funding, references and appendicies 45
4 Targets 47
5 Funding 48
6 Monitoring 49

References 50

Appendix A: Criteria for selecting in-transit sites 52

Appendix B: Key legislation, strategies and plans 53
National policy context 53
Regional policy context 55
Other key national and regional policies and plans 57

Appendix C: Stakeholders directly and indirectly involved in stock truck effluent 58
Roles of the parties directly involved 58

Appendix D: The Policy Planning and Funding Manual – requirements for stock truck effluent facilities 62

Appendix E: Regional population and stock numbers 63

List of figures

Figure 1: Structure of the strategy. 11
Figure 2: Strategy preparation process. 12
Figure 3 Legislative and policy framework 13
Figure 4: Stock effluent complaints logged between March 2005 – March 2010. 20
Figure 5: Principal road network in the Waikato region. 21
Figure 6: Stock effluent disposal facility located at Tapapa on State Highway 5 between Tirau and Rotorua. 23
Figure 7: Settling pond at the Tapapa site. 23
Figure 8: Saleyards and meatworks with and without stock effluent disposal facilities. 25
Figure 9: Existing and potential in-transit sites within and outside the region. 26
Figure 10: Proposed road network improvements. 27
Figure 11: Stock effluent holding tank. 28
Figure 12: Emptying of the tank. 28

List of tables

Table 1: Land area, population and livestock numbers per New Zealand region. 17
Table 2: Sale days and truck numbers 18
Table 3: Proposed in-transit stock effluent disposal sites. 24
Table 4: Policies that are related to the objectives. 35

Chairman's foreword

Effluent spilling onto roads from stock trucks is a long standing and significant problem in the Waikato region.

These spillages pose safety and health threats to road users and communities, damage to roads and the environment through run-off, along with amenity and invasive effects.

As a dairy farmer I am well aware of the issues surrounding stock truck effluent. The matter is complicated and involves many parties including farmers, stock agents, sale yard operators, meat processing companies, stock transport firms, road controlling authorities and local government.

Stock truck effluent first came to the attention of authorities in March 1992 when a motorcyclist died after his machine skidded on effluent discharging from a stock truck. In 1994 Environment Waikato, in conjunction with South Waikato District Council, hosted a stock truck effluent forum at Tapapa Hall, which attracted over 80 interested parties. As a result of the forum, a Stock Truck Effluent Control Study was completed in June 1994, which recommended a programme, including education, and a pilot of disposal facilities in the south Waikato district, together with a range of other supporting measures.

Over the years the Waikato region has fallen behind in its response to stock truck effluent disposal. A number of other regions have taken a proactive approach and constructed a network of effluent disposal facilities, whereas the Waikato has relied on a small number of existing sites predominantly in south Waikato and Taupo.

Norm Barker
Chairman
Regional Transport Committee

The time has come for the region to relook at the problem and put in place measures to clean up effluent spillages on roads. The problem has not gone away and requires a multi-pronged approach from all parties concerned. The approach will include education, engineering, enforcement, regulation and advocacy to adequately address the issue. A 2009 workshop with Environment Waikato councillors has affirmed a willingness for the regional council to take a coordination role to address stock truck effluent.

The Regional Stock Truck Effluent Working Group has worked hard to prepare this strategy and I would like to acknowledge and thank the members for their contributions.

This strategy provides a very good platform to take the region forward in our effort to reduce stock effluent spillages on regional roads.

I commend this strategy to you.

Norm Barker
Chairman
Regional Transport Committee

Glossary of terms

HNO	The Highway and Network Operations group of the NZ Transport Agency
LGA	Local Government Act 2002
LTP	Long Term Plan
LTMA	Land Transport Management Act 2003
NLTP	National Land Transport Programme
NSTEWG	The National Stock Truck Effluent Working Group, the National Working Group
NZTS	New Zealand Transport Strategy
RCA	Road Controlling Authority
RMA	Resource Management Act 1991
RLTP	Regional Land Transport Programme
RLTS	Regional Land Transport Strategy
RPP	Regional Partnerships and Planning group of the NZ Transport Agency
RPS	Waikato Regional Policy Statement
RSTEWG	The Waikato Regional Stock Truck Effluent Working Group, the Regional Working Group
RTC	Regional Transport Committee
WRP	Waikato Regional Plan

Executive summary

The Regional Stock Truck Effluent Strategy for the Waikato region (the strategy) is based on the vision:

Working toward zero discharge of stock effluent from trucks onto Waikato roads by 2020.

The strategy has been developed by Environment Waikato (Waikato Regional Council) in collaboration with the Regional Stock Truck Effluent Working Group and in accordance with the Regional Land Transport Strategy 2006-2016.

The purpose of the strategy is to set out a holistic strategic framework to prevent or minimise stock truck effluent discharge onto roads in the Waikato region. It achieves this by identifying 14 key objectives, eight policies and 24 actions for all stakeholders who hold joint responsibility for the management of stock truck effluent. The policies have been developed in recognition that there are eight key issues contributing to the amount of effluent being spilt onto roads.

The Waikato region has the largest number of livestock of any region in New Zealand, with over five million livestock. Thousands of stock truck trips are made each year, from farms to meat processing plants, to and from sale yards and between farms, incurring a significant amount of stock effluent discharge onto roads and road reserves.

This problem is exacerbated by a lack of suitable effluent disposal facilities in the region for stock transport carriers to use in-transit or at their destinations. However, the issue is not just for stock transport companies to address.

There are a number of stakeholders directly and indirectly involved in the movement of stock, and a number of contributing factors to the problem, including:

- the farmer, responsible for the management of livestock up to the time they are loaded onto the truck, and for receiving new or relocated stock
- the stock truck, which should have a stock effluent holding tank fitted
- meat processors, which should have stock truck effluent disposal facilities
- sale yards, which should have stock truck effluent disposal facilities
- a lack of in-transit stock truck effluent disposal facilities.

Every stakeholder can contribute to the better management of stock truck effluent to minimise the amount which ends up on the road or roadside receiving environments.

Stock truck effluent spillages onto Waikato roads and environs cause numerous adverse effects, including:

- contamination of land and waterways (the effluent can contain viruses, bacteria, nitrogen and concentrations of noxious plant seeds)
- road safety hazards for cyclists, motorcyclists and motor vehicles
- health hazards to people including cyclists, motorcyclists, pedestrians and roading contractors
- nuisance odours
- negative public perceptions
- damage to road surfaces.

The National Stock Truck Effluent Working Group was established in 1997 to address this problem, and subsequently developed the Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on the Roads (1999).

The Regional Stock Truck Effluent Working Group was established by Environment Waikato to address this issue at the regional level and to work towards identifying and establishing a series of in-transit sites, along with contributing towards implementing Transit New Zealand's North Island Stock Truck Effluent Strategy (North Island strategy). The North Island strategy promoted the implementation of a network of stock truck effluent disposal sites. Top priorities for in-transit sites are Te Kuiti, Putaruru and Taupo.

Five additional sites under consideration by either the NZ Transport Agency or the Regional Stock Truck Effluent Working Group are:

- Mercer service centre
- Te Kuiti (additional site)
- Otorohanga (an addition to the existing truck wash facility)
- Morrinsville sale yards
- Turangi.

Other potential stock truck effluent disposal sites are:

- Matamata/Kaimai
- Paeroa
- Thames
- Whatawhata
- Frankton
- Mangatawhiri
- Hikuai.

The eight key policies identified in this strategy to address the stock truck effluent problem are:

1 to minimise the amount of effluent deposited by stock in-transit by having stock stood off green feed prior to transportation
2 to establish a series of in-transit stock truck effluent disposal facilities
3 to require the provision of stock truck effluent disposal facilities at all meat processing plants and all sale yards in the Waikato
4 to require the provision and effective use of effluent holding tanks by all stock truck and trailer units
5 to encourage farmers to receive and dispose of stock truck effluent from stock being delivered to their property
6 that the construction, operation and maintenance of in-transit stock truck effluent facilities be regionally coordinated and that the NZ Transport Agency and territorial councils contribute funds on a fair and equitable basis
7 that related regional and district strategies and plans of the Waikato region implement this strategy
8 regional stakeholders will continue to collaborate on all issues related to stock truck effluent.

Through the implementation of these policies and 24 actions, it is expected that the incidence of stock truck discharges onto Waikato roads will be significantly reduced. This will benefit the land transport system, the community and the environment. Additionally, with continued improved practices in the transportation of livestock around the region, it is expected that there will be an improvement to the quality, image, and reputation of agriculture and the region.

Typical spillage scene.

Background and development of strategy

Sale day in Morrinsville.

1 Background and development of strategy

1.1 Introduction

The Waikato Regional Stock Truck Effluent Strategy (the strategy) has been prepared by Environment Waikato in line with the requirements outlined in the Waikato Regional Land Transport Strategy (RLTS) 2006-2016. The RLTS sets a framework for moving towards a more sustainable, integrated and multi-modal transport system for the Waikato region.

Stock truck effluent spillage onto Waikato roads has been viewed for some time as an issue which needs to be addressed because of the adverse effects it has on the natural environment, public health, road safety, road quality and the amenity of other road users.

Environment Waikato has worked in collaboration with the Regional Stock Truck Effluent Working Group (the Regional Working Group) to develop the strategy. Development of the strategy has involved a wide range of local, regional and national stakeholders.

The strategy provides a framework for confirming and progressing new stock effluent disposal sites and identifies an agreed set of policies and actions for all stakeholders to follow, including:

- farmers
- livestock carriers
- stock agents
- sale yard operators and owners
- meat processors
- Environment Waikato and territorial authorities
- road controlling authorities.

A full description of the roles of these stakeholders can be found in Appendix C.

1.2 Purpose

The purpose of the strategy is to set out a strategic framework to prevent stock truck effluent discharge onto roads in the Waikato region. The strategy will be implemented in consultation with the Regional Working Group.

The strategy sets out a regionally agreed set of issues, objectives, policies and actions (including education and funding), that outline the roles and responsibilities of Environment Waikato and the Regional Working Group members and provides clear guidelines for the organisations.

1.3 Why stock truck effluent is a problem

The Waikato region has the largest number of livestock of any region in New Zealand. With over five million livestock (dairy cows, cattle and sheep) there are thousands of stock truck trips per year made from farms to meat processing plants, to and from sale yards and between farms.

While the majority of these trips are undertaken within the region, a large number are to and from adjoining regions, along with long-haul trips to the South Island.

If livestock have not been stood prior to transport, a significant amount of stock effluent is produced during these trips which rapidly fills the stock truck effluent holding tanks. Sometimes this effluent is discharged from the tanks onto the road or onto roadside reserves. An effluent spill can be as little as a few litres or the entire contents of an effluent tank (approximately 200-400 litres).

Stock truck effluent discharges can take a number of forms, including:

- spillages where the stock truck effluent holding tank is full and overflows, or the stock truck has no effluent holding tank
- the deliberate emptying of stock effluent on the roadside.

Spills are also more frequent at particular times of the year, for example on 'Gypsy Day' (at the beginning of June) when farmers, sharemilkers and their stock relocate to other farms often without the stock being stood prior to transport. The lack of suitable effluent disposal facilities in the region exacerbates this problem.

Stock effluent discharge on roads remains a major problem in the Waikato region, prompting concern for human and environmental health and presenting a number of problems for road controlling authorities, Environment Waikato and the industry sector.

1.4 Roles and responsibilities

1.4.1 Industry stakeholders

What seems at face value a simple issue is made more complex by the number of organisations involved in the process of moving stock; it is not only the responsibility of stock transport carriers to address.

The Industry Code of Practice for the Minimisation of Stock Effluent Spillages from Trucks on Roads 1999 (code of practice) identifies a large group of stakeholders, all of whom play a role directly or indirectly in minimising the amount of stock effluent which ends up on Waikato roads.

Stock movement involves a number of stakeholders:

- farmers are responsible for the management of livestock up to the time they are loaded onto the truck (including standing stock for a minimum of four hours prior to transport), and for receiving new or relocated stock
- livestock carriers who should have stock effluent holding tanks fitted on their truck and trailers
- meat processors who should have a stock truck effluent disposal facility on their site
- sale yard operators who should have a stock truck effluent disposal facility on their site
- managers of in-transit stock truck effluent disposal facilities.

Every stakeholder in the process can contribute positively (or negatively) to the management of stock truck effluent and the amount which ends up untreated on the road or in roadside receiving environments.

1.4.2 Regional and local government

The following local government organisations have specific partnership roles.

Territorial authorities

- Work with stakeholders involved with the handling and transportation of stock.
- Can apply for financial assistance from the New Zealand Transport Agency (NZ Transport Agency) to construct and operate in-transit stock effluent disposal facilities.
- Identify suitable in-transit sites.
- Issue, monitor and enforce land use consents for sale yards and meat processing plants.

Environment Waikato

- Coordinator and facilitator.
- Work with territorial authorities, the NZ Transport Agency and industry to help identify suitable in-transit sites.
- Promote the code of practice.
- Assist with education of stakeholders.
- Control discharges to the environment through the Waikato Regional Plan (WRP)
- Establish, with the Regional Working Group, a fair method of sharing the cost of developing and maintaining in-transit stock truck effluent disposal facilities.
- Assist territorial authorities to prepare funding applications to the NZ Transport Agency for stock truck effluent disposal facilities
- On completion of the strategy, develop a programme for implementation.

1.4.3 Tangata whenua

The New Zealand Transport Strategy (NZTS) references the Treaty of Waitangi (p.18) noting:

"The government is committed to upholding the principles of the treaty. Central to the treaty principles is that Maori have a special relationship with their ancestral lands, water, sites, waahi tapu and other taonga. Transport planning and decision making needs to take account of that relationship as well as the more general needs of Maori communities. Therefore the government is committed to ensuring that Maori are involved in making decisions about transport that affect their cultural, economic, environmental and social wellbeing.

The Land Transport Management Act 2003, provides specific opportunities for Maori to participate in decision making processes about land transport and for approved organisations to foster the development of Maori capacity to contribute to these processes."

The overriding vision of the treaty is that of – Mahi tahi – working together in partnership.

It is the intention of the strategy that meaningful engagement occurs with tangata whenua to align with their iwi planning documents. It is important to engage with tangata whenua to enable them to contribute in decision making processes on stock truck effluent collection and disposal. It is recognised that there are particular sensitivities for tangata whenua regarding sewage, effluent and water.

The disposal of effluent is addressed through the Regional Policy Statement (RPS) and the WRP. The RPS is currently being reviewed and tangata whenua are actively involved in this process.

1.5 Strategy structure

The structure of the strategy is outlined in Figure 1.

Figure 1: Structure of the strategy.

1.6 Strategy preparation process

The strategy sets out a course of action based on information collected and work undertaken in the region on stock truck effluent issues since 1994.

1.6.1 The National Stock Truck Effluent Working Group

The National Stock Truck Effluent Working Group (the National Working Group) was established in Wellington in 1997 to address the problem of stock truck effluent on roads.

The National Working Group comprises representatives of Federated Farmers, the Meat Industry Association, the Road Transport Forum, the New Zealand Stock and Station Agents Association, road controlling authorities, regional councils, the NZ Transport Agency, and the ministries of transport, agriculture and forestry and fisheries. The National Working Group comes under the umbrella of the Road Controlling Authorities Forum and meets approximately three times a year.

The principle focus of the National Working Group is to ensure there is a nationwide network of effluent disposal facilities, both in-transit and at destination points, namely meat processing plants and sale yards. It is also implementing a communications strategy to ensure that all parties understand and fulfil their roles.

The Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on the Roads was developed by the National Working Group in 1999.

1.6.2 The Waikato Regional Stock Truck Effluent Working Group

The Regional Working Group was established in 1998 in recognition that stock truck effluent spillage was an issue affecting the region and was one that required a collaborative approach. Members include representatives from all local authorities, Federated Farmers, the Meat Industry Association, the Road Transport Association (RTA), the New Zealand Stock and Station Agents Association, road controlling authorities, the NZ Transport Agency, Ministry of Transport, NZ Police and Associated Auctioneers.

The Regional Working Group was re-convened in 2007 by Environment Waikato in response to delays in constructing the in-transit disposal sites, recognition of the need to monitor the effectiveness of the sites once constructed and to progress implementation of the code of practice. The Regional Working Group has focused on developing the strategy since 2008.

A workshop was held with the Regional Working Group in August 2009 to discuss a draft set of objectives, policies and actions, and a workshop also held with the Environment Waikato Policy Committee in October 2009. Figure 2 shows the strategy development process.

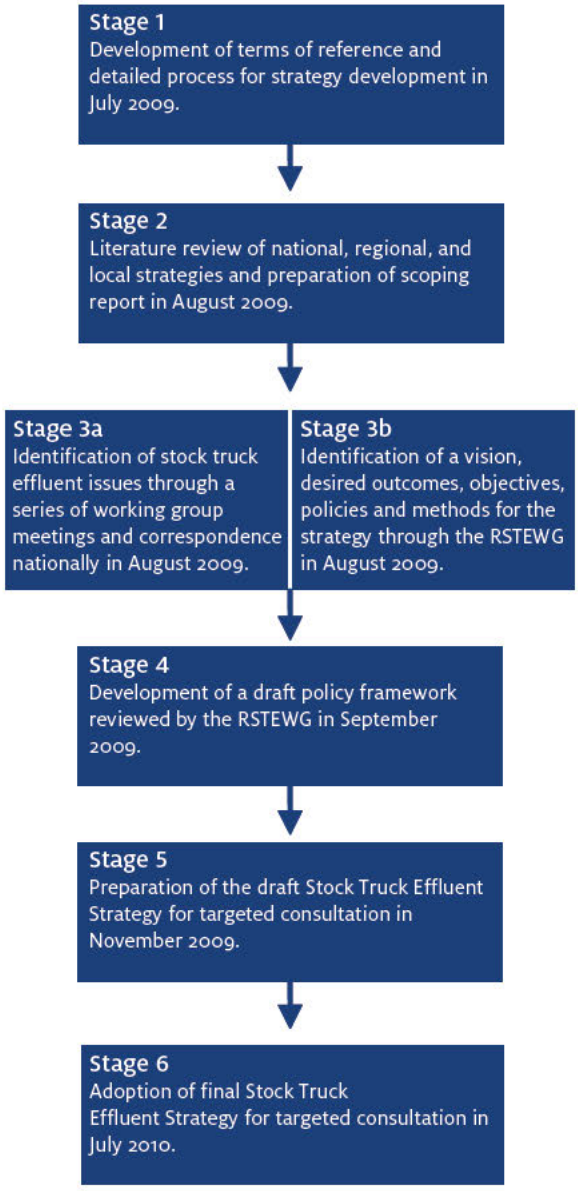

Figure 2: Strategy preparation process.

1.7 Legislative and policy context

There are a number of national and regional legislative and policy drivers that provide the framework for the strategy. These are identified in Figure 3 and summarised in Appendix B.

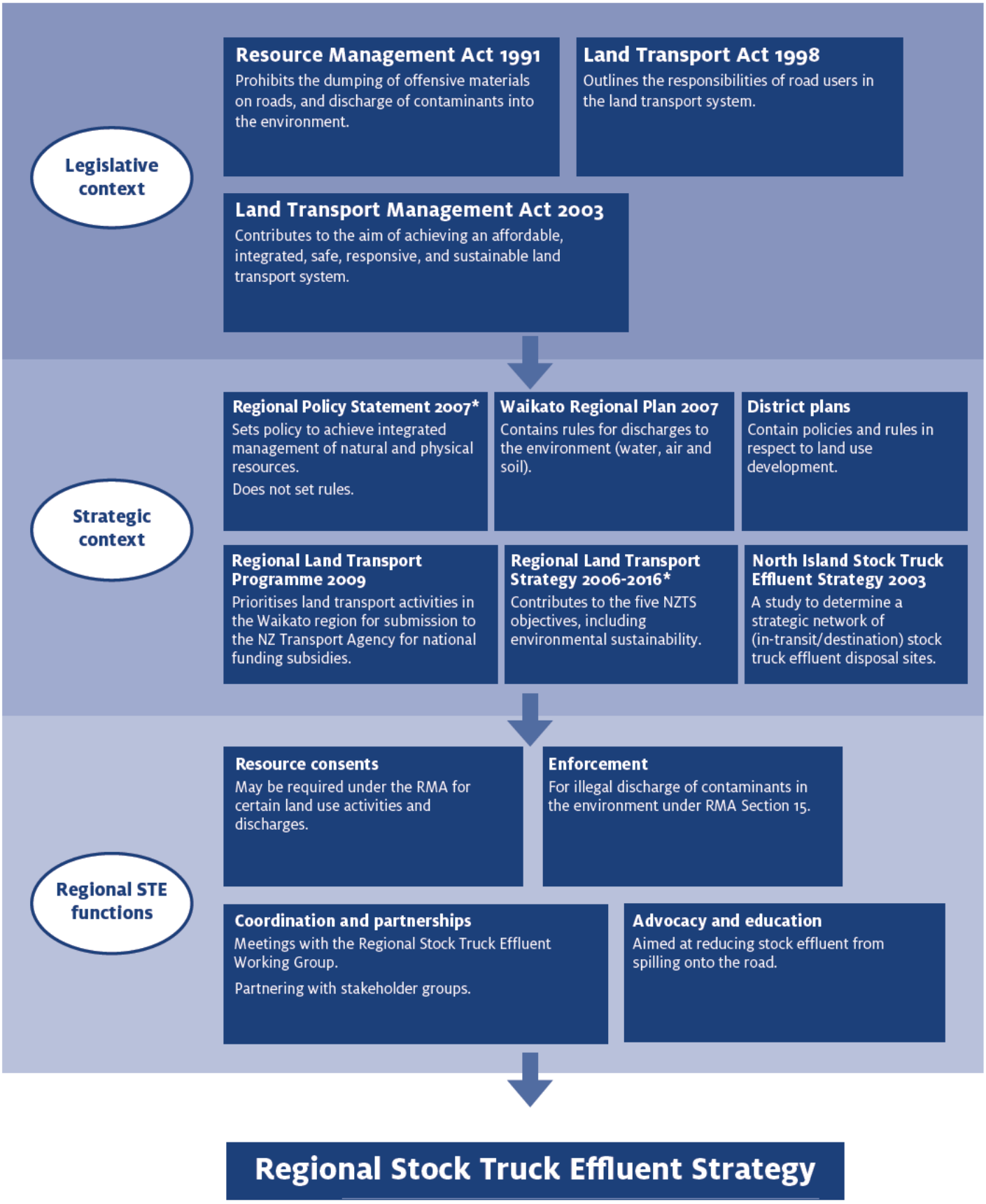

Figure 3 Legislative and policy framework

* Currently under review

Stock truck effluent in the Waikato region

2 Stock truck effluent in the Waikato region

2.1 Background

Transport of livestock by road in New Zealand began in the 1950s. Prior to this, stock was predominantly transported by rail (Thull, 1999).

Stock truck effluent finds its way onto the road or road environs either in-transit or through deliberate dumping. Spills are also increased during certain times of the year.

Stock effluent spillage issues came to the fore nationally in 1992 when a motorcyclist was killed in the south Waikato district when he skidded on effluent spilled from a stock truck. This incident highlighted the issue of road safety in relation to effluent spillage on roads. This incident coincided with the introduction of the Resource Management Act (RMA) which brought with it a greater awareness about the environmental impacts of stock truck effluent on New Zealand roads (Ministry of Transport, 2003).

A Waikato Regional Stock Truck Effluent Forum was held at Tapapa Hall in March 1994 (Environment Waikato, 1994). Recommended outcomes from the forum included education, identification of a network of disposal sites and advocacy to amend the Land Transport Act (LTA) by including animal waste as part of the definition of 'load' (meaning that stock truck effluent spills could be classed as an 'insecure load').

In 1998 two stock truck effluent disposal sites were established by South Waikato District Council at the Putaruru sale yards[1] (collection only) and at Tapapa on State Highway 5 (collection and treatment though a two-pond system) (NSTEWG, 2003).

The stock truck effluent issue was specifically referenced in the RLTS 2002:

"The provision of facilities for collecting effluent from stock trucks, and, where an investigation has identified the need for a facility, territorial authorities will be encouraged to install such a facility. The Regional Land Transport Committee will also lobby central government for a change to the legislation to allow prosecution for effluent from stock trucks being disposed of anywhere other than an appropriate facility (Section 3.1.2)."

It continued to be identified in the RLTS 2006. Action 5.4 states:

"Environment Waikato to support the identification and development of stock truck effluent sites around the region through the Regional Stock Truck Effluent Working Group."

2.1.1 Stock population in the Waikato region

The Waikato region has the fifth largest land area in New Zealand, the fourth highest resident population, and more than twice the number of dairy cattle of Canterbury, the next highest region (see Table 1). In addition it has the nation's second largest number of beef cattle (just behind the adjoining Manawatu region). There are also over two million sheep in the region.

Table 1: Land area, population and livestock numbers per New Zealand region.

Region	Resident population 2006	Land area	Number of dairy cattle	Number of beef cattle	Number of sheep
Canterbury	521,832	56,788	754,937	584,806	7,166,822
Southland	90,873	55,049	432,642	207,588	5,662,387
Otago	193,800	38,478	218,264	292,355	6,031,166
West coast	31,329	36,335	152,481	30,275	54,094
Waikato	382,713	34,711	1,669,472	676,584	2,660,145
Northland	148,470	30,110	367,183	495,833	534,452
Manawatu	222,423	25,306	393,453	680,960	6,746,989
Bay of Plenty	257,379	21,835	299,013	119,743	385,373
Hawkes Bay	147,783	21,399	80,200	438,366	3,624,018
Auckland	1,303,068	16,316	113,344	156,787	287,589
Wellington	448,956	15,943	92,787	155,910	1,822,057
Taranaki	104,124	12,700	589,573	136,715	656,144

Table 1 shows the high number of stock in adjoining regions, some of which will travel to sale yards, meat processing plants and farms using Waikato roads. In particular, the high number of dairy cattle in Taranaki and the high number of sheep in the Manawatu and Hawkes Bay means there are significant cross boundary stock truck trips from these regions. This reinforces the need for a national approach to comprehensively address the issues. Appendix E displays territorial authorities in the region with population and stock numbers.

[1] Putaruru sale yards has since closed in 2003.

2.1.2 Stock numbers transported

Stock being transported by truck either travel to a meat processing plant, sale yards, or to another farm. It is a one-way journey for stock travelling to a meat processing plant, so numbers are likely to be more accurate.

It is more difficult to ascertain accurate numbers of stock travelling in and out of sale yards, as the stock is effectively being trucked to a new destination once sold. Approximate numbers of incoming and outgoing stock trucks to sale yards for the year 2008 are shown in Table 2.

Table 2: Sale days and truck numbers[2]

Sale yard location	Number of sale days per year	Number of trucks arriving and departing per day	Estimated number of truck movements per year
Frankton	180	50	9,000
Morrinsville	130	40	5,200
Te Kuiti	130	40	5,200
Cambridge	46	20	920
Paeroa	60	40	2,400
Tuakau	230	60	13,800
Te Awamutu	60	30	1,800
Taupo	18	12	216
Otorohanga (private farm)	48	4	192
Matamata	50	20	1,000
Total	952		39,728

It is estimated that somewhere in the vicinity of 39,700 stock truck trips are made every year in the region, to and from sale yards.

There will be an even higher number of trips made to meat processing plants as well as thousands of trips made between farms.

2.1.3 Waikato livestock carriers

The Waikato region has the largest number of livestock carriers in New Zealand, with 29 companies employing some 240 stock trucks. Beef and dairy cattle are the primary stock being transported. Apart from some smaller livestock carriers (with less than three trucks in the fleet), most companies drive in all directions in the region and further in the North Island. About eight companies travel to the South Island.

In the Waikato region and beyond, 75 per cent of stock transported is bound for meat processing plants. The remaining 25 per cent is spread evenly between the sale yards or farm to farm.

Of the 29 livestock carriers in the Waikato region, there are 24 (83 per cent) that state they have their own truck wash. The effluent collected from the truck yards is transported away to be spread on pasture.

2.1.4 Stock truck effluent on roads

There are a number of ways effluent from stock trucks finds its way onto the roads. The failure to stand livestock prior to transport significantly increases the likelihood of spillages.

1 **In-transit spills**
This generally occurs where the stock truck effluent holding tank is full, or the stock truck has no effluent holding tank. These types of spills may be relatively low in volume, but higher in frequency. In cases where the effluent tank is full, spills are more frequent on steeper gradients and bends. Apart from impacting on the receiving environments, in terms of entering waterways, spills can pose a significant nuisance for car drivers following behind and for cyclists or pedestrians, especially in rural settlements. Urban environments are also affected by unpleasant smells, and health concerns from residents with houses close to the road or patrons at cafés and shopping centres.

2 **Deliberate dumping**
This occurs when a driver deliberately releases effluent from the tanks while driving or parked, such as on the side of the road or in a roadside reserve. This occurs primarily because the effluent tanks are full and the effluent has not been able to be discharged at the destination or there are insufficient in-transit facilities located on their route. Deliberate dumping can have significant environmental impacts because of the concentrated release of untreated effluent into the environment.

3 **'Gypsy Day'**
The numbers of stock being transported around the region escalates on 'Gypsy Day' (early June), when farmers and sharemilkers relocate to other farms and thousands of dairy cows are transported in trucks or on the roads. A

[2] This table estimates a possible number of trips made every year to and from sale yards in the Waikato region. The number of trucks arriving and departing to each sale yard has been derived from anecdotal evidence provided by each sale yard.

number of smaller stock trucks and trailers may be used, and many of these do not have effluent holding tanks.

2.1.5 Key influences behind spills

Key influences contributing to stock truck effluent spillages include:

- the ability of the trucking industry to collect and dispose of effluent (the volume of effluent deposited in the truck depends on the time stock is stood off green feed prior to transportation, the type of pasture/feed stock have been on prior to transportation and the distance of travel; wet weather increases the problem)
- a lack of stock effluent disposal facilities across the region at stockyards, meat processors, and in-transit
- not every stock truck has an effluent tank
- a lack of adequate notice from stock purchasers to enable farmers to stand their stock off grass prior to transportation
- some destination stock effluent disposal facilities are not open for use
- more forestry being converted to dairy and dry stock farms, more intensification of dairy farms
- a lack of enforcement because of anomalies in the legislation
- 'Not in my back yard' (NIMBY) syndrome where there is resistance to a stock effluent disposal facility, especially if location is near food shops or public parking areas
- a lack of commitment or ownership to fund facilities
- a lack of leadership.

2.2 Effects of stock truck effluent spillage

The effects of stock truck effluent spillages include:

- contamination of waterways and soils (if the effluent contains viruses, bacteria or high nitrogen levels) and the distribution of pest plant seeds
- road safety hazards for cyclists, motorcyclists and motor vehicles
- health hazards to cyclists, motorcyclists, pedestrians and road works teams
- nuisance odours, especially if effluent is spilled in urban areas
- negative public perceptions
- damage to road surfaces
- culturally offensive.

2.2.1 Scale of the problem

Data from the previous census shows that the Waikato region has 11,000 farms, of which 4,500 are dairy. The remaining 6,500 are made up of sheep, beef, deer and goats. The region contains approximately 1,700,000 dairy stock. Dairy farming is expected to increase over the next few years as forestry land is converted. Therefore stock numbers being transported in, out and within the region are expected to increase.

The stock truck effluent problem is not unique to the Waikato; it is an issue in all regions. There is a lack of empirical evidence, other than photographs of effluent dumped on the road and complaints logs recorded by territorial authorities and Environment Waikato. Feedback from the Police and the Road Transport Association has also been collected. From March 2005 to March 2010, 102 complaints were recorded, however it is widely accepted that the problem is significantly under-reported and not all territorial authorities keep records of this issue. Figure 4 shows the locations of spillages and road side dumpings in the region recorded through complaints.

The raw ingredients.

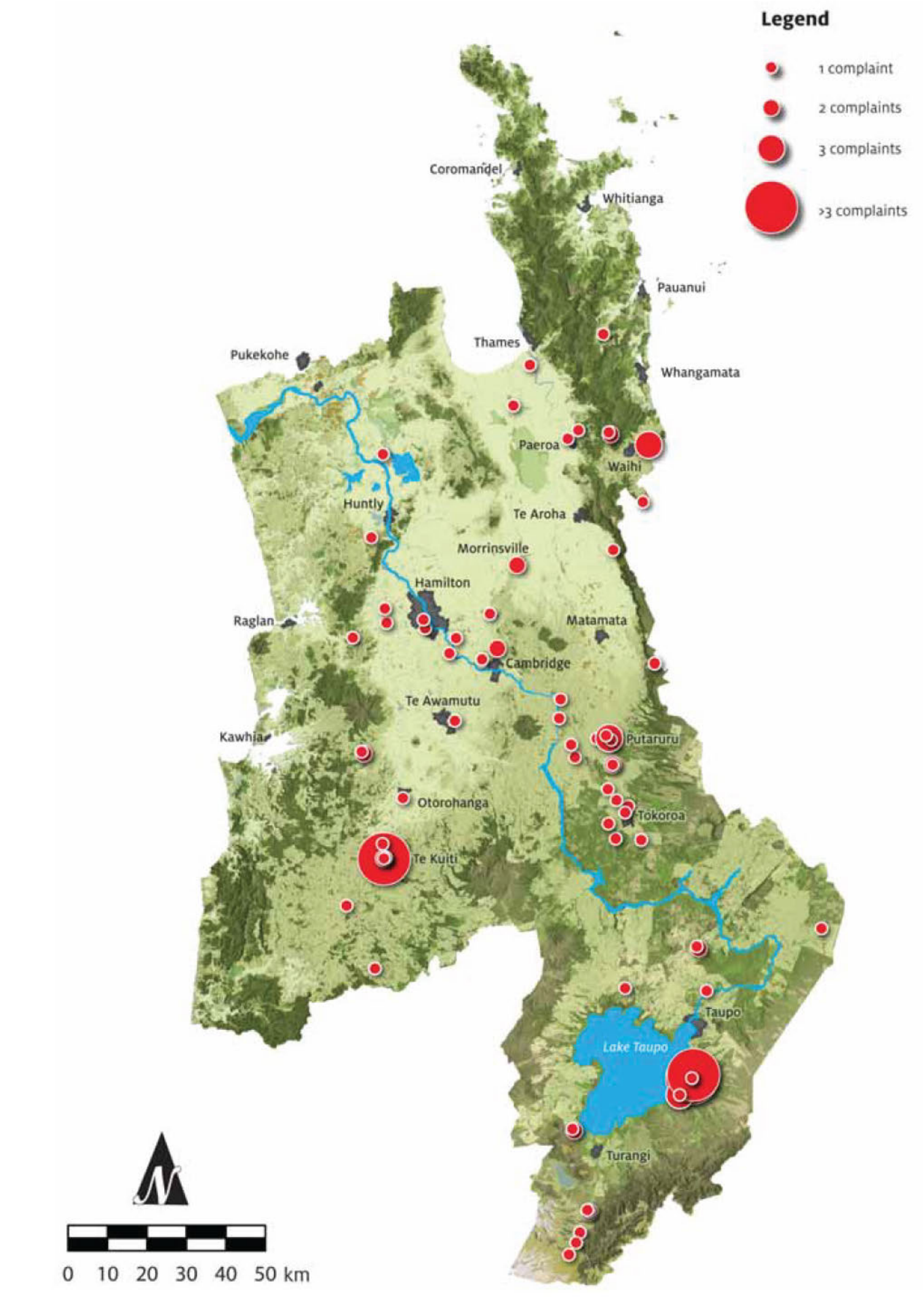

Figure 4: Stock effluent complaints logged between March 2005 – March 2010.

2.2.2 Emerging issue – trade waste and municipal sewage

A recent issue has emerged around trade waste and municipal sewage treatment that is having an impact on stock truck effluent disposal.

The Local Government Act 2002 (LGA) introduced the Trade Waste Bylaw in 2005 to control trade waste discharges. The bylaw affects businesses with a discharge to sewer, however some territorial authorities have a stormwater bylaw which designates contaminated (by a trade activity) stormwater as trade waste also.

A number of meat processing plants and sale yards in the Waikato region are within or at the edge of urban settlements and connected to the municipal sewerage system. In terms of stock truck effluent, providing a company has suitable pre-treatment, stock effluent is a permissible waste under the bylaw, although it carries a significant risk profile.

Those discharging trade waste are required to use an independent consultant to undertake compliance monitoring if the risk profile is high enough. This may be ongoing and carries significant cost. Trade waste characterisation surveys are also undertaken on potential high risk dischargers, which again incur cost.

If a company can comply with the Trade Waste Bylaw then approval can be granted with conditions. If the discharge is greater than 5m³/day, then trade waste fees are charged on top of the annual consent fee.

Some truck wash facilities end up receiving stock effluent. The extra solids require the use of extra water, along with the testing of the solid matter which may be tested for five or more components, all of which have separate costs. Costs vary from one local council to another.

Many meat processing companies are finding the costs too high and choosing to shut off their stock truck effluent disposal facilities, leaving the truck driver no choice but to depart with a full effluent tank.

2.2.3 State highways in the Waikato region

The Waikato region has more state highways than any other region. Four major state highways intersect with Hamilton. They are state highways 1, 3, 23 and 26, effectively north, south, east and west, all hosting large numbers of stock trucks each day (see Figure 5). Eighteen other principal state highways are located in the Waikato region, all of which are used by stock trucks on a regular basis.

Figure 5: Principal road and rail network in the Waikato region.

2.3 Key issues

To achieve the outcomes of the strategy and reduce the amount of effluent being discharged from stock trucks, there are a number of key issues that need to be addressed.

2.3.1 Stock not stood off green pasture prior to cartage

It is estimated that an average dairy cow weighing 500kg, on an average day, excretes 54kg of effluent when grazing on pasture (Vanderholm, 1984). When the cow is transported, the animal is exposed to higher than normal levels of stress and naturally reacts by excreting onto the stock crate deck. With each truck and trailer unit holding on average 40 head of cattle, significant volumes of effluent can be generated by stock in-transit if the animals are allowed to feed normally prior to cartage.

In accordance with the industry code of practice it is recommended that stock should be stood off green feed prior to transport for at least four hours (NSTEWG, 1999). If stock is not stood off green feed prior to transportation then, dependant upon the weather, stock truck effluent holding tanks could fill up within 5km to 80km of travel. Once the holding tank is full, stock truck effluent is discharged or spilt onto the roads.

It is generally agreed that the farmer can influence the amount of effluent that may be deposited on a truck. The Industry Code of Practice suggests that if farmers can stand their stock off green feed for a minimum of 4 hours, preferably 12 hours, prior to being transported, the animal would leave less effluent on the truck. Standing stock off green feed, but with access to water, is recognised as the best method of reducing the amount of effluent that might otherwise be deposited on the truck.

Animals that are stood off greed feed, but with access to water for four hours or more prior to transportation will excrete less during cartage. Less effluent collected in holding tanks enables trucks to travel greater distances before the tanks need to be emptied. This leads to fewer spills on the road.

Standing stock off green feed prior to transportation reduces stress on the stock which arrive in a healthier and cleaner condition with less bruising, resulting in improved meat quality.

Surveys have shown that some farmers still believe it is financially beneficial to keep stock on green feed up to the time of departure to maintain animal weight (Taranaki Regional Council, 2001; Environment Waikato, 2008). Slight weight loss between departure and final destination can be attributed to stress, however the biggest contributing factor is dehydration. Farmers' payments from meat processors are generally based on carcass weight, as opposed to live weight. There is no financial gain to be had from keeping stock on feed until departure as any additional weight gained remains in the animals' gut. The same applies to sale yards which also weigh the animals.

Animals that arrive dirty as a result of effluent during transport are not well received by meat processing companies, as this increases their processing costs. This is another reason to stand stock prior to transport.

Other reasons for stock not being stood off green feed might include:

- insufficient notice of pick up by livestock carriers, stock buyers or meat processors
- limited space in yards, especially if there are bulls that need to remain in separate herds to reduce brawling; mixing bull herds for a few hours in stockyards could result in injuries to animals or damage to yards
- adverse weather conditions could lead a farmer to decide against standing stock off green feed, as stock yards could quickly become muddy which could soil animal hides, cause damage to yard surfaces or produce effluent or sediment run-off.

2.3.2 Lack of in-transit disposal sites in the Waikato region

Unlike some other regions in New Zealand, the Waikato has relatively few dedicated in-transit truck stock effluent disposal facilities. This lack of a full network of in-transit sites means that a large number of stock trucks will have holding tanks which are full or overflowing for part of their trip. This can occur even if all destinations do accept stock truck effluent, especially during long-haul cartage.

Stock truck effluent disposal facilities have been established at three sites in the Waikato region, all as a result of the North Island strategy. However, in effect the Waikato region only has one operative dedicated in-transit site at Tapapa, on State Highway 5 located in the south Waikato district. This is an

in-transit disposal facility with a two-pond treatment system. The following photographs show the first pond at this site is particularly deep, and there has been no need to remove the heavy waste. Any build up of solid waste would be removed by a contractor.

Figure 6: Stock effluent disposal facility located at Tapapa on State Highway 5 between Tirau and Rotorua.

Figure 7: Settling pond at the Tapapa site.

In 1998 Environment Waikato commissioned Opus International Consultants[3] to assess the feasibility of six potential stock truck effluent unloading and disposal sites which were identified in the Stock Truck Effluent Control Study for the Waikato region 1994. In 1999 this study was extended to four additional sites. The sites assessed for feasibility were:

- Otorohanga – existing truck wash facility
- Frankton sale yards
- Paeroa sale yards
- Morrinsville sale yards
- Wairakei – BP Service Station
- Turangi – Shell Service Station
- Te Kuiti sale yards
- Te Kuiti Lime Haulage
- Piopio sale yards
- Taupo sale yards.

In 2003, Transit New Zealand[4] commissioned Opus International Consultants, to undertake a comprehensive North Island assessment of stock truck disposal sites (2003). The study used livestock carrier surveys and network modelling to determine the optimum number of strategic sites for effluent dumping to reduce stock truck effluent spillage, increase road user safety and decrease environmental stress. This study recognised that there are many cross boundary stock truck trips and the network of facilities needs to be identified on a wider scale involving other regions.

This study had two key assumptions:

- that all trucks and trailers were fitted with a 300 litre capacity effluent holding tank
- that all key destinations received stock truck effluent and that stock truck holding tanks were empty when trucks left these destinations.

The study recommended the establishment of three priority in-transit sites in the Waikato region following site specific investigations. See Table 3. Appendix A descirbes criteria for selecting in-transit sites.

[3] Opus International Consultants Ltd: Investigation of Waikato region stock truck effluent disposal sites, Phase 1, 1998.

[4] NZ Transport Agency previously Transit New Zealand.

Table 3: Proposed in-transit stock effluent disposal sites.

Investigations and recommendations	Sites
'Priority 1' in-transit sites (Opus, 2003)	• Te Kuiti • Putaruru • Taupo
'Priority 3' in-transit sites (Opus, 2003)	• Ngaruawahia
Other sites under consideration by either the NZ Transport Agency or the Regional Working Group	• Mercer service centre • Te Kuiti (weighbridge south Te Kuiti) • Otorohanga (additional to the existing truck wash facility) • Morrinsville sale yards • Turangi
Other potential sites	• Matamata/Kaimai • Paeroa • Thames • Whatawhata • Frankton • Mangatawhiri • Hikuai

While many of the other sites currently under consideration are not identified in the North Island strategy they are all considered necessary by the Regional Working Group. Following investigations there may be amendments to the list of sites recommended by the North Island strategy. For example a facility is recommended at Bombay, however following site specific investigation, a site at Mercer is being favoured by the the NZ Transport Agency, which may mean a site on State Highway 2 may also be required. Initial investigations of a potential site at Mangatawhiri are also being undertaken. Figure 8 shows existing meat processing plants and sale yards with and without facilities. Figure 9 shows existing and potential sites within and outside the region.

In the first instance the Waikato region should aim to install as a minimum the Priority 1 in-transit sites identified in the North Island strategy. Additional sites are also required for a more comprehensive network of stock truck effluent disposal facilities in the region.

There are a number of proposed road network improvements, including town bypasses, which should be considered for potential stock truck effluent disposal facilities in future planning. Figure 10 shows the proposed road network improvements.

What goes in, must come out.

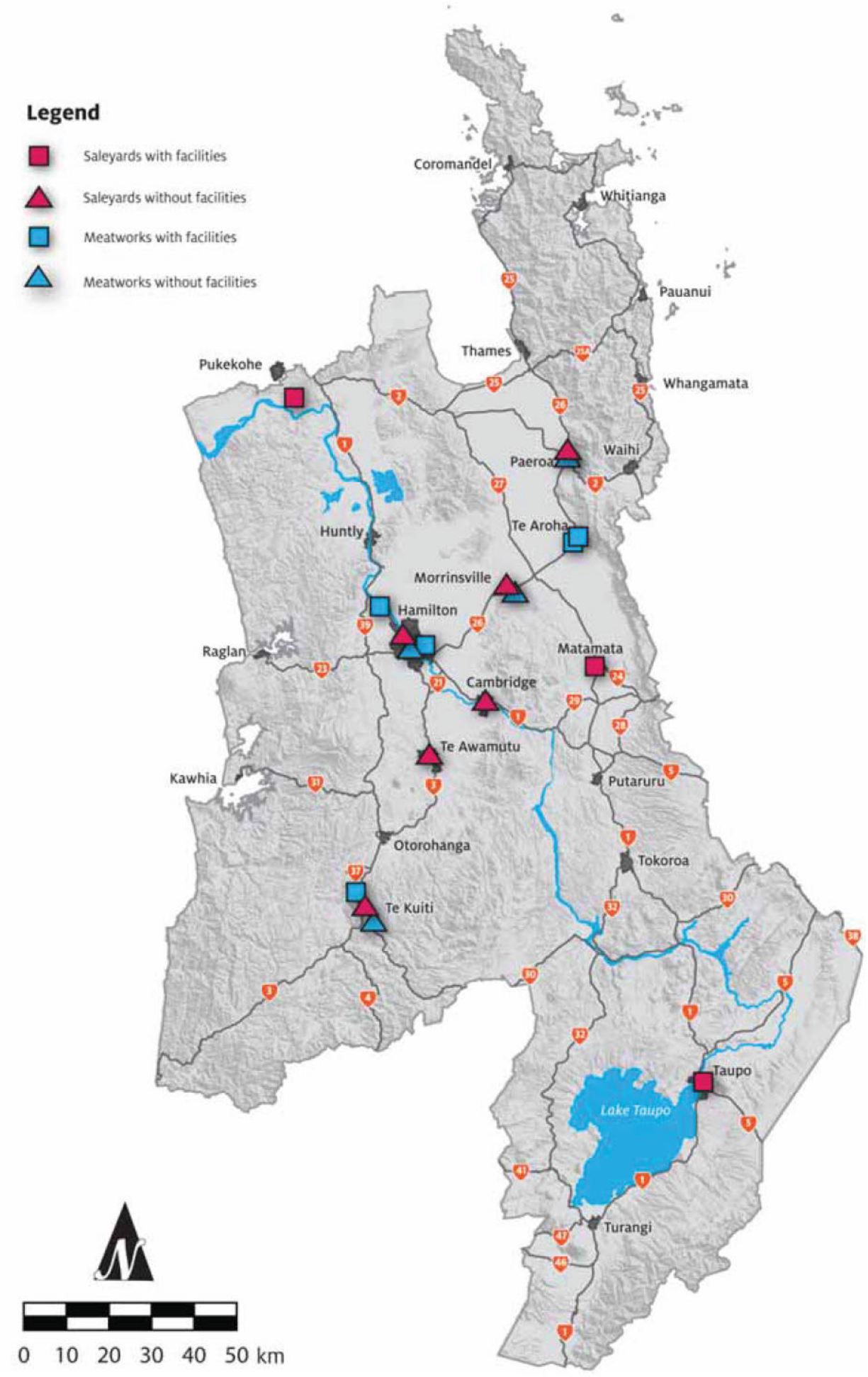

Figure 8: Saleyards and meatworks with and without stock effluent disposal facilities.

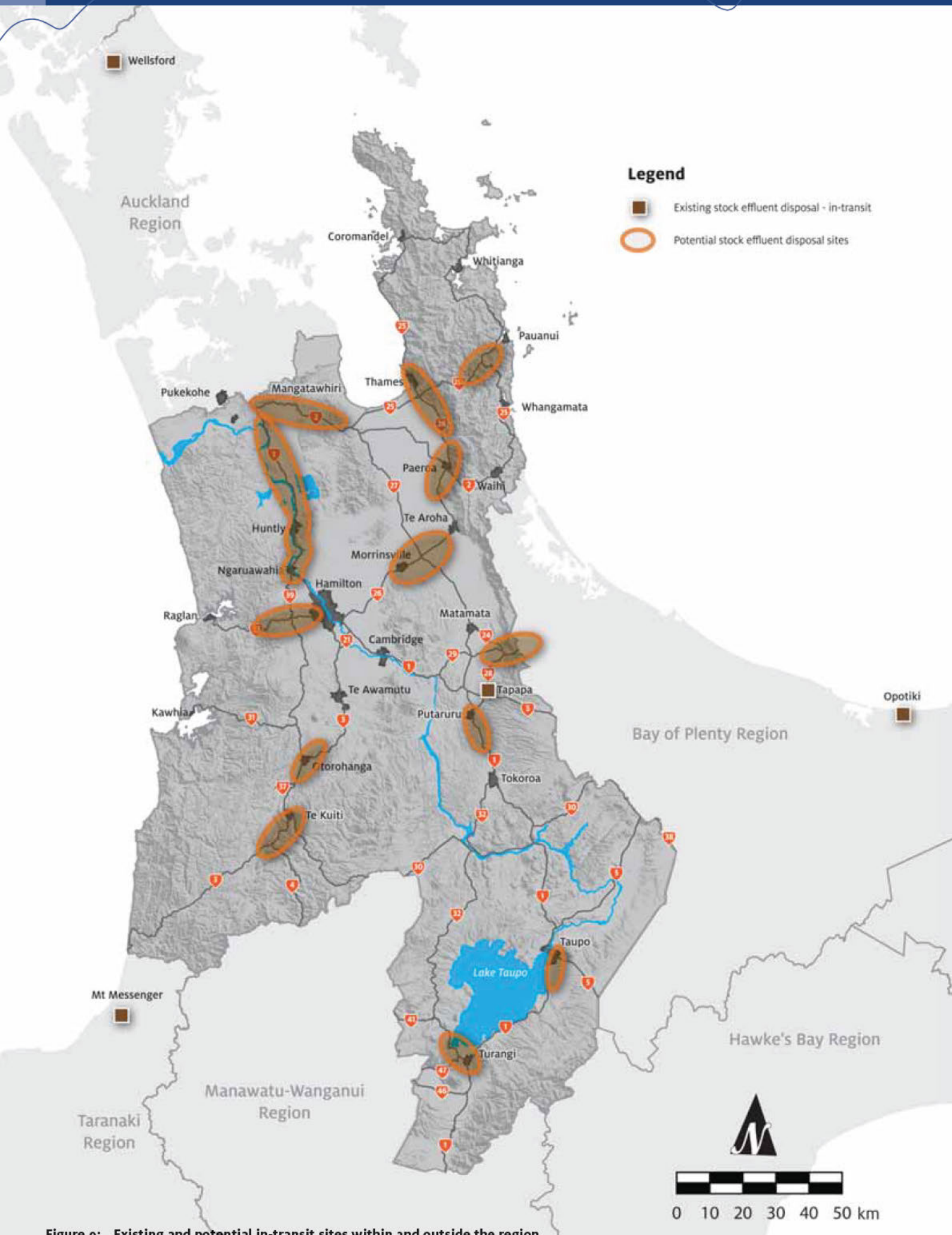

Figure 9: Existing and potential in-transit sites within and outside the region.

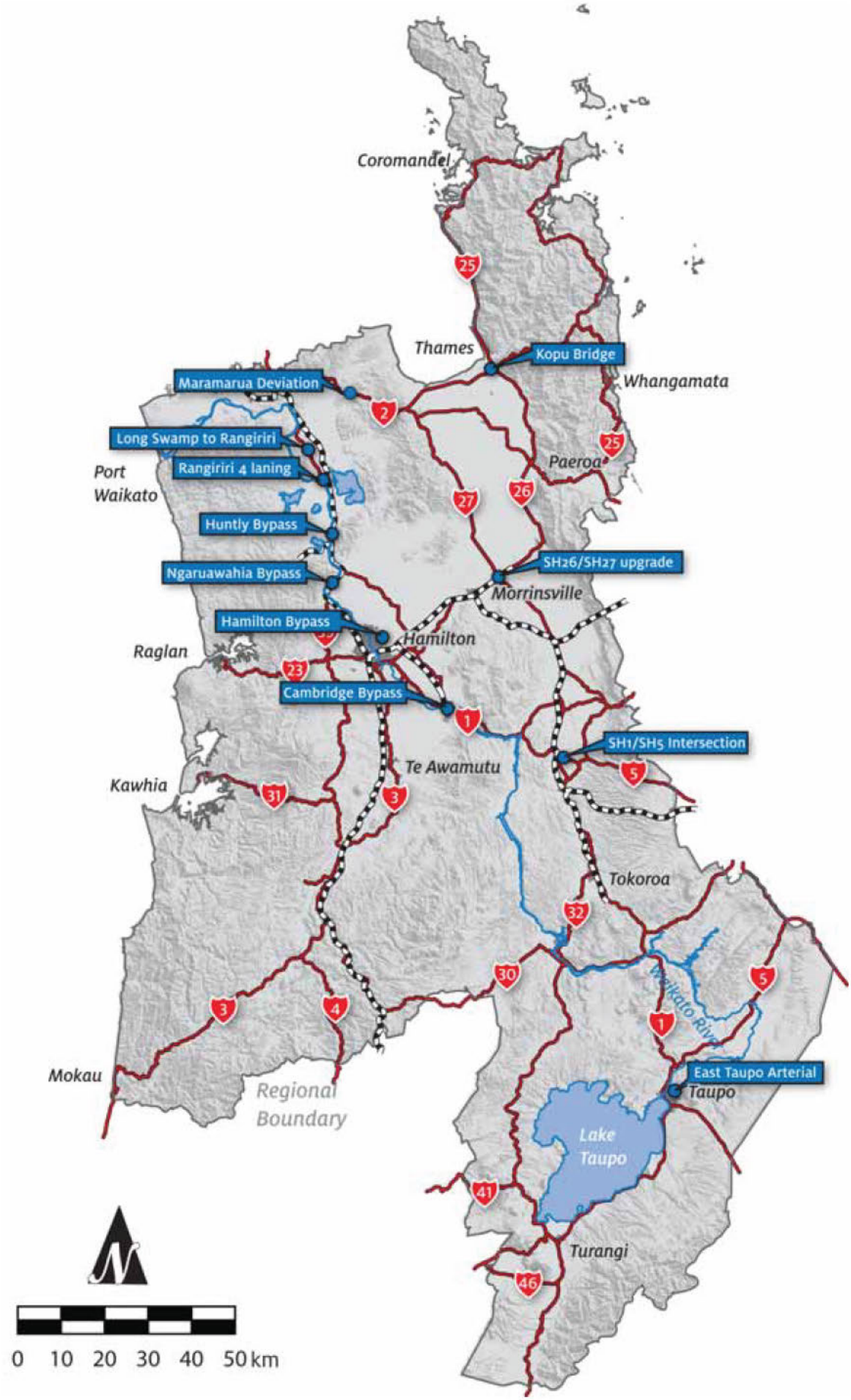

Figure 10: Proposed road network improvements.

2.3.3 Lack of operative disposal facilities at key destinations

There are currently nine meat processing facilities operating in the Waikato. Of these, eight have either truck wash or stock truck effluent disposal facilities. Of the eight with facilities, three are closed off to visiting stock trucks and used for storage. See Appendix C for full list of meat processors.

Currently there are nine major sale yards in the Waikato and several minor sale yards that are used on an irregular basis. Only Taupo, Matamata and Tuakau sale yards have stock truck effluent disposal facilities available for visiting trucks. All sale yards have effluent disposal systems for the disposal of effluent from stock held within the sale yards. These systems generally have the potential to be upgraded to treat stock truck effluent.

The North Island strategy bases one of its recommendations (of developing a network of in-transit facilities) on the premise that key destinations, notably sale yards and meat processing plants take effluent from trucks delivering stock to them. It is crucial to the operation of the entire network that this occurs or else it is likely that the public will have to wear the cost of continued stock truck effluent discharges on the road or of funding numerous additional in-transit disposal facilities.

Figure 8 shows the location of all meat processing agencies and sale yards in the Waikato region.

2.3.4 Stock truck holding tanks

In 1991 the Road Transport Forum introduced a voluntary programme for fitting effluent holding tanks to stock truck and trailer units. In 1997, the Road Transport Forum introduced a quality assurance scheme for livestock carriers whereby effluent holding tanks are mandatory equipment. Livestock carriers involved in the quality assurance programme fitted effluent tanks to all their stock truck and trailer units (generally 300 litre effluent tanks).

The Road Transport Association has worked collaboratively with the stock truck industry in the Waikato, resulting in a large percentage of stock trucks having holding tanks fitted, with capacities ranging from 200 litres to 400 litres. Although not legally required, all new trucks are usually fitted with stock effluent holding tanks. Holding tanks have a finite capacity though, and once full, effluent overflows onto the road.

In addition to the many larger and often articulated stock trucks operating on Waikato roads, many farmers use their own smaller stock trucks for transporting stock. These trucks do not have stock effluent holding tanks.

While the strategy encourages the fitting of effluent holding tanks to all stock trucks, it should be noted that approximately 95 per cent of stock trucks in the Waikato have purchased and fitted, or are waiting to fit, effluent holding tanks.

Figure 11: Stock effluent holding tank.

Figure 12: Emptying of the tank.

2.3.5 Farmers/reluctant to accept effluent from stock delivered

Farmers can receive stock from farm-to-farm relocations or from deliveries of new stock from sale yards. In this respect farms are also important destinations for stock, yet often farmers are reluctant or unable to also take the effluent collected on the stock truck from that stock.

Farmers have significant ability to minimise the amount of stock truck effluent spillage by accepting the effluent that has been collected by the truck enroute to their farms. The amount of effluent will be relatively small – at most 400 litres and if the stock has originated from sale yards, or has been stood beforehand, it is likely to be significantly less than 400 litres. In most cases it is relatively easy for the farmer to manage this amount of effluent. The task is made more difficult when there are mixed loads of stock for more than one farm. The industry code of practice states that farmers, and the transport operators, should negotiate how this will be managed.

The discharge of stock truck effluent to land is a permitted activity subject to the conditions under Rule 3.5.5.1 of the Waikato Regional Plan. Effluent disposal can be achieved without needing a receiving facility as long as the stock truck is able to drive into a designated paddock and discharge from the holding tanks while in motion and as long as the activity complies with the conditions of Rule 3.5.5.1. Spreading 400 litres of effluent would require approximately 16 square metres of paddock to comply with the 25 millimetres of depth per application as described in 3.5.5.1 (e).

Some factors have been identified which make on-farm effluent dumping from stock trucks complicated.

- Farmers sometimes have concerns about biosecurity issues with seeds being transported in animal waste or when there are mixed loads it is unfair to expect one farmer to receive the waste from another farmer's stock.
- Meat and fibre farmers do not necessarily have effluent disposal systems.
- Dairy effluent disposal systems may not be within easy access of stock trucks.
- Wet weather or high antecedent soil moisture conditions could preclude stock truck effluent being disposed into a soak pit, or onto pasture because of run-off concerns.
- Farmers may have concerns about diseased stock effluent contaminating pasture.

2.3.6 Development, operation and maintenance of facilities

Not all territorial authorities have in-transit stock truck effluent disposal facilities, yet stock trucks use road corridors in all districts. Currently the NZ Transport Agency fully funds road access and egress at in-transit disposal sites, and contributes 50 per cent to the construction of in-transit disposal facilities (the territorial authority pays the other 50 per cent). Funding of the operation and maintenance of the facility is currently similarly split between territorial authorities and the NZ Transport Agency. A full description of the NZ Transport Agency's, Planning, Programming and Funding Manual policy is provided in Appendix D.

Some territorial authorities will need to develop more than one in-transit facility while other territorial authorities may not be required to develop any, even though stock trucks picking up from and delivering to farms in all territorial authorities will benefit from the regional (and inter-regional) network of facilities. While construction costs for an in-transit facility will vary (for example $30,000-$400,000) the cost of the ongoing operation and maintenance of the facility is also significant.

There is no national policy guidance on the funding of operation and maintenance of in-transit sites, especially if there is more than one facility sited in a district. However, there are examples available of how other regions manage the intra-regional funding of in-transit sites between local authorities. For example, in the Canterbury region, all territorial authorities with in-transit sites submit their annual operation and maintenance costs to Environment Canterbury who, using an agreed formula, pro rata the costs (or credits) by invoice to the territorial authority within the region. The pro rata concept can be based on a number of factors including population, kilometres of state highway or head of stock within each district.

A regionally acceptable funding programme in the Waikato region will ensure a more equitable distribution and advance the delivery of in-transit facilities. Regional coordination of funding could also extend to the construction of the facilities, with Environment Waikato submitting applications on behalf of the territorial authorities.

Discussions on funding are yet to be effectively debated by the region's local authorities.

The strategy assumes that all destination stock truck facilities and their related operation and maintenance costs will be borne by the private operators of those facilities. In some cases a territorial authority may also wish to contribute to these costs although they should not feel obligated to do so unless these facilities are also made available to all stock trucks passing through.

2.3.7 Regional/district strategies and plans

To date very few regional or territorial authority strategies and plans have had regard to the issues discussed in the strategy. Stock truck effluent spillage has clear adverse environmental effects and this should be reflected more explicitly in resource management documents, namely regional and district plans.

The WRP and district plans contain rules which control activities such as land use and discharges.

Further direction could also be provided to those issuing discharge consents for sale yards and meat processing plants to ensure that the need to take responsibility for stock truck effluent is also integrated into consents.

The RPS is undergoing a review in 2010/11 and will contain relevant directions for regional and district plans around soil and water contamination. Both regional and district plans must give effect to the RPS.

The RLTS is also undergoing review and could elevate the issue and provide further policy guidance on stock truck effluent issues.

2.3.8 Enforcing current legislation

If there were more stock truck effluent disposal facilities in the region, there would be less need to take enforcement actions against those livestock carriers that spill or dump stock effluent. While enforcement is not the whole solution, there is a need to ensure that aspects such as environmental sustainability, road safety and human health are considered.

A full description of the legislative and policy framework for the strategy is outlined in section 2 and Appendix B.

There is only one act that can be used to control stock truck effluent spills on the road – the RMA, through regional and district plans.

The RMA, (section 15), restricts discharges of contaminants to the environment. The WRP contains rules about discharges of effluent, however, does not explicitly address discharges from stock trucks onto roads. Another complication is the high burden of proof to prove a breach of this nature.

Environment Waikato has issued one infringement notice under the RMA (15) (2A) for discharge of effluent onto roads.

A suggested recommendation is to include rules in the WRP prohibiting or restricting discharge of stock truck effluent onto roads.

The only other applicable legislation is the LTA 1998, which has a loophole. While Section 42 describes an insecure load as an offence, the definition of "load" 42(c) states: "*Does not include animal wastes discharged from animals being carried on a vehicle at the time*". Until this section of the act is repealed, no action can be taken.

Vision, objectives, policies, implementation actions and outcomes

3 Vision, objectives, policies, implementation actions and outcomes

This chapter outlines the vision, the objectives, policies and corresponding actions of the strategy.

The strategy is intended to support and implement the RLTS. Section 4 is set out in the same manner as policies and actions in the RLTS. For each of the nine key RLTS outcome areas, specific policy has been developed for stock truck effluent. The RLTS outcome areas are:

- economic development
- safety and personal security
- access and mobility
- public health
- environmental sustainability
- integration
- responsiveness
- energy efficiency
- funding.

Implementation actions (including responsibilities and timing) and the expected results are then noted.

The Regional Working Group assisted with the development of the vision and outcomes of the strategy. Policy has been developed using information gained in meetings and workshops held across the region since 2007 and from national, regional and local studies.

It is important to consider the policies and actions as a whole. Note that many policies will relate to more than one outcome area, however they are placed in the strategy where most logical.

3.1 Vision

The vision for the strategy is:

Working towards zero discharge of stock effluent from trucks onto Waikato roads by 2020.

3.2 Objectives

This section sets out objectives for each of the RLTS outcome areas.

3.2.1 Economic development

The RLTS's desired outcome for economic development is:

"A transport system that promotes continued growth and economic development of the region and provides for the efficient, affordable movement of people and goods in and through the region".

The strategy will contribute to this desired outcome by way of the following objectives:

O1 To improve the image of stock transportation for all road users including tourists/visitors.

O2 To establish facilities which enable the efficient and sustainable transportation of animal stock within the region and inter-regionally.

O3 To promote practices in the transportation of livestock which improve the quality, reputation and value of meat and dairy products.

O4 To reduce road damage caused by stock truck effluent discharge[5].

3.2.2 Safety and personal security

The RLTS's desired outcome for safety and personal security is:

"Substantial improvement of safety and personal security within all modes of transport".

The Waikato Regional Road Safety Strategy details policies and actions to achieve improved safety for all road users, including those most vulnerable.

The strategy will contribute to this desired outcome by way of the following objective:

O5 To establish facilities and good practice for stock truck transportation which contributes to the safe and efficient operation of the region's roads for all road users.

[5] For the purpose of this strategy 'discharge' means any incidents of stock truck effluent discharge or spillage, whether intentional or unintentional, onto public roads.

3.2.3 Access and mobility

The RLTS's desired outcome for access and mobility is:

"A transport system that is inclusive, accessible and affordable".

The strategy will contribute to this desired outcome by way of the following objectives:

O6 To establish facilities for stock trucks which are readily accessible and appropriately located.

O7 To ensure that effluent spillage from stock trucks is managed to ensure that it does not reduce the usability or amenity of the environment for other users.

3.2.4 Public health

The RLTS's desired outcome for public health is:

"A transport system that promotes positive public health outcomes".

The strategy will contribute to this desired outcome by way of the following objective:

O8 To ensure that the management of stock truck effluent avoids adverse effects on the health of all road users and the wider community.

3.2.5 Environmental sustainability

The RLTS's desired outcome for environmental sustainability is:

"A sustainable transport system that minimises adverse effects on the environment".

The strategy will contribute to this desired outcome by way of the following objective:

O9 To ensure that in the process of transporting livestock that adverse effects of effluent spillage on the natural and built environment are avoided, remedied or mitigated.

3.2.6 Integration

The RLTS's desired outcomes for integration are:

"Integrated land use and transport planning"; and *"Integrated transport modes".*

The strategy will contribute to these desired outcomes by way of the following objectives:

O10 To ensure that all key stakeholders have regard to national, regional and district level strategy and policy on the management of stock truck effluent.

O11 To ensure that stock truck effluent issues are recognised in key transport and land use strategies and plans throughout the region.

3.2.7 Responsiveness

The RLTS's desired outcome for responsiveness is:

"A transport system that responds to the needs of the community".

The strategy will contribute to the desired outcome by way of the following objective:

O12 To ensure that the network of facilities for stock trucks is able to respond to industry changes, including the amount of stock being transported, changes to stock destinations and the type of livestock being transported.

3.2.8 Energy efficiency

The RLTS's desired outcome for energy efficiency is:

"A transport system that is designed, constructed and operated to improve energy efficiency".

The strategy will contribute to the desired outcome by way of the following objective:

O13 To ensure that stock truck facilities are located and designed in an energy efficient manner and that they do not unnecessarily add to the distance travelled by the stock trucks.

3.2.9 Funding

The RLTS's desired outcome for funding is:

"A transport system that is funded to fully implement local, regional and national strategies".

The strategy will contribute to the desired outcome by way of the following objective:

O14 To ensure that any stock truck facilities required are able to be fully funded and that funding is sourced in a manner that recognises the national, regional and local benefits which accrue from this investment.

3.3 Policies and actions

The strategy contains eight policies which relate directly to the issues identified and give effect to the objectives. Because of the integrated manner of which the above objectives some policies give effect to several objectives. Table 4 below details the relationship between the objectives and policies in the strategy.

Table 4: Policies that are related to the objectives.

Objectives	Policy 1	Policy 2	Policy 3	Policy 4	Policy 5	Policy 6	Policy 7	Policy 8
Economic development	✓	✓	✓	✓	✓			
Safety and personal security	✓	✓	✓	✓	✓		✓	
Access and mobility		✓			✓		✓	
Public health	✓	✓	✓	✓	✓			
Environmental sustainability	✓	✓	✓	✓	✓		✓	
Integration	✓	✓				✓	✓	✓
Responsiveness	✓	✓	✓					✓
Energy efficiency		✓	✓		✓	✓		
Funding		✓				✓		✓

The strategy has been prepared to provide a set of policies and actions to guide a number of major stakeholders, which include:

- farmers
- Federated Farmers
- livestock carriers
- agents (stock and meat processing companies)
- sale yard operators and owners
- stock and station agents
- meat processors and meat processing plants
- Environment Waikato and territorial authorities
- road controlling authorities
- the NZ Transport Agency.

Waitomo district.

Policy 1: To minimise the amount of effluent deposited by stock in-transit by having stock stood off green feed prior to transportation.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A1	**Farmers** are to stand stock off green feed (but with access to water) for at least four hours directly prior to transport.	Federated Farmers, Environment Waikato, livestock carriers, stock agents, RTA, meat processors.	Ongoing
A2	**Livestock carrier industry** to investigate the development of a stock pick up notification system to ensure that farmers are given sufficient notification time to stand stock off green feed.	Meat processing plants, sale yard operators, stock and station agents, the Regional Working Group.	2011/12
A3	**Livestock industry** sector to investigate the use of animal status declaration cards, either independently or integrated with the Meat Industry Standards, to record the time stock were taken off green feed, the time arranged for stock to be picked up and the actual time stock were picked up.	RTA, livestock carriers, Federated Farmers, Meat Industry Standards Council, the Regional Working Group.	2011/12
A4	**The Regional Working Group** to develop an education programme to raise awareness of the benefits of standing stock off green feed prior to cartage.	Federated Farmers, RTA, meat processing plants, sale yard operators, stock agents/buyers, Agriculture ITO.	2010/12

Expected results

- An increase in the amount of stock being stood prior to cartage.
- Reduced incidents of stock truck effluent discharges reported on the road network including long-haul movements.
- The arrival of healthier and cleaner animals at their destinations.

Reasons

Action 1 recognises that it is up to farmers to ensure that stock is stood properly prior to cartage. However it is also recognised that the Regional Working Group has a continual role in raising the awareness of farmers of the benefits of standing stock via **Action 4**. Such an education programme would emphasise the respective responsibilities of each party. It could include a demonstration of financial and animal health benefits to farmers and the meat industry from the standing of stock.

The road transport industry, which includes truck operators and the RTA, can exert considerable pressure on stock owners and agents to make sure stock is stood off green feed prior to transportation. It is also in the truck operator's interest to ensure that minimal effluent is generated during the trip as any effluent generated is their responsibility. The operator can be prosecuted for discharging or spilling effluent to the road, roadside or a water body under the RMA.

Action 2 addresses the need for a system to be in place to ensure that farmers are given enough notification time to stand stock off green feed. On occasion, the failure by farmers to stand stock may be attributed to the lack of notice given by either the truck operator or the stock agent.

Action 3 seeks to further investigate improved and coordinated methods for recording base data on when stock is picked up. The Meat Industry Standards Council is currently considering introducing Stock Declaration Cards as a record to confirm that standing of stock has taken place. **Action 4** recognises that ongoing education aimed at all stakeholders is key to making sure that all stakeholders are aware of their responsibilities.

Policy 2: To minimise incidents of stock truck effluent on road corridors and adjacent receiving environments through the establishment of a series of in-transit stock truck effluent disposal facilities.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A5	**Territorial authorities and the NZ Transport Agency (HNO)** to develop in-transit stock truck effluent disposal facilities at strategic locations throughout the Waikato in accordance with Figure 9 and criteria (Appendix A).	Environment Waikato, RTA, the Regional Working Group.	2010-14
A6	**The NZ Transport Agency (HNO)** to investigate the development of in-transit stock truck effluent disposal facilities when planning state highway improvements in accordance with Figure 9 and criteria (Appendix A) and/or where a bypass is likely to render an existing facility redundant or inefficient. To be carried out in partnership with local authorities.	Environment Waikato, territorial authorities.	Ongoing
A7	**The Regional Working Group** to lobby adjoining local authorities and the NZ Transport Agency to ensure that progress is being made on the provision of identified in-transit disposal sites in adjoining regions.	Environment Waikato, the NZ Transport Agency, territorial authorities and adjoining local authorities.	Ongoing
A8	**The Regional Working Group** to advocate for a 10 year review of the North Island Stock Truck Effluent Strategy Study.	Environment Waikato, the NZ Transport Agency, territorial authorities and adjoining local authorities.	2010-12

Expected results

- Improved network of in-transit stock truck disposal facilities on regional roads.
- Reduced incidents of stock truck effluent discharges reported on the road network and receiving environments.

Reasons

The increase in stock movement in the region increases the potential for effluent to be discharged onto Waikato roads. The spillage of effluent from stock trucks is identified as an environmental sustainability issue in the RLTS 2006.

Members of the Regional Working Group are the principal parties responsible for preventing and minimising effluent spillage to roads, and should therefore be responsible for identifying strategic locations for the construction of stock truck effluent disposal sites in the Waikato. However, to ensure that effective regard is given to the North Island strategy, **Action 5** should place emphasis on developing in-transit sites at Putaruru, Te Kuiti and Taupo.

The effectiveness of the in-transit disposal facilities will be reviewed with the possibility of further in-transit facilities being constructed in the future. All in-transit stock truck effluent disposal facilities will be constructed in accordance with the criteria in Appendix A and with reference to the Practical Guide to Providing Facilities for Stock Truck Effluent Disposal (National Stock Truck Effluent Working Group, 2003).

Action 6 recognises that with a number of state highway projects planned or advanced that opportunities may arise to develop a stock truck effluent facility ahead of time (in a cost effective and safer manner) as part of a highway upgrade, such as a bypass or road widening. It is important that the the NZ Transport Agency is aware of cases where a bypass may render an existing in-transit or shared disposal facility redundant. Planning in advance allows the territorial authority to apply for funding.

As emphasised in the North Island strategy in-transit sites must act as a network. It will therefore be very important that those sites identified in neighbouring regions are constructed. **Action 7** recognises the effective reduction of stock truck effluent spills on Waikato roads requires the cooperation of adjoining authorities and the completion of a North Island network of in-transit sites.

This strategy applies to the Waikato region, and while the

North Island Stock Truck Effluent Strategy has provided a comprehensive background for this strategy, **Action 8** will allow for a wider and more updated study for the North Island. With proposed new legislation around heavy vehicle productivity and the introduction of heavier vehicles, it is possible that bigger stock crates may replace the current designs, enabling stock trucks to carry a greater amount of stock effluent.

One of three settling ponds on Mt Messenger, Taranaki.

Policy 3: To minimise incidents of stock truck effluent being spilt onto roads by requiring the provision of stock truck effluent disposal facilities at all major meat processing plants and all sale yards in the Waikato.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A9	**All meat processing plants and sale yards** to provide and maintain appropriate facilities for the disposal of stock truck effluent and be responsible for stock truck tanks being empty when trucks leave their facility.	Environment Waikato, territorial authorities, RTA, the Regional Working Group, livestock carriers.	Ongoing
A10	**All meat processing plants, sale yards and cartage companies** should provide appropriate facilities for the washing down of stock trucks at their sites.	Environment Waikato, territorial authorities.	Ongoing
A11	**Road Transport Association**, on behalf of the Regional Working Group, to encourage trucking companies to wash down stock trucks immediately following stock delivery at meat processing plants and sale yards and advocate for the improvement of these facilities where not effective.	Territorial authorities, the Regional Working Group, meat processing companies, Associated Auctioneers.	Ongoing
A12	**Territorial authorities** to monitor and enforce the conditions of resource consents for meat processors and sale yards with regard to the provision of effluent disposal facilities.	Environment Waikato.	Ongoing

Expected results

- Improved network of stock truck effluent disposal facilities throughout the region.
- Reduced incidents of stock truck effluent discharge reported on the road network.
- Cleaner stock trucks.

Reasons

Action 9 recognises that all meat processing facilities and sale yards in the Waikato should make available, and continually maintain, facilities to receive and appropriately dispose of stock truck effluent from stock delivered to their premises. Effluent disposal facilities must be user friendly, and designed and located to minimise inconvenience and time loss to livestock carriers. **Action 9** also provides for Environment Waikato and district councils to assist meat processors by providing information, advice and technical assistance on disposal facilities that are appropriate and effective, in order to meet the needs of meat processors.

Action 10 recognises, stock trucks should be washed down immediately following stock delivery to a meat processing plant or sale yard, assisting to reduce the risk of disease. Key destinations should provide the appropriate facilities to enable this to occur. If washing facilities are not currently meeting the needs of truck operators due to their design or accessibility, meat processing plants and sale yards should endeavour to rectify this.

Action 11 recognises the Road Transport Industry must encourage livestock carriers to clean stock trucks prior to collecting stock for transportation and to wash down stock

trucks immediately following stock delivery. This will ensure that effluent holding tanks have maximum capacity. This is subject to meat processors and sale yards providing adequate facilities. These actions will assist to reduce any risk of disease.

Action 12 seeks to ensure that facilities are being operated and maintained in accordance with the relevant resource consent.

The potential for enforcement action provides incentive for meat processors and sale yards to ensure facilities are operated and maintained appropriately, and monitoring of this by territorial authorities helps ensure their compliance with the agreement outlined in the industry code of practice, and with the directions of this strategy.

Roadside spillage.

Policy 4: To minimise the amount of effluent being spilt on Waikato roads by requiring the provision and effective use of effluent holding tanks in all stock truck and trailer units.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A13	**Livestock carriers** to implement the stock crate code that ensures effluent holding tanks are installed in all stock truck and trailer units.	RTA, Federated Farmers, Environment Waikato, cartage companies.	Ongoing

Expected results

- Reduced incidents of stock truck effluent discharges on the road network.
- All stock truck and trailer units fitted with appropriate effluent holding tanks.

Reason

Action 13 requires that stock truck and trailer unit owners install effluent holding tanks in all stock truck and trailer units. This action requires the continuation of the Road Transport Forum's 1997 quality assurance scheme whereby the installation of effluent holding tanks in stock truck and trailer units is mandatory.

Truck wash at Morrinsville sale yards.

Policy 5: To minimise incidents of stock truck effluent being discharged onto regional roads by encouraging farmers to receive and dispose of effluent from stock being delivered to their property.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A 14	**The Regional Working Group** to encourage farmers to receive and dispose of effluent collected on trucks from stock being delivered onto their property.	RTA, Environment Waikato, Agriculture ITO.	Ongoing
A15	**The Regional Working Group** to develop a factsheet outlining good practice for the disposal of effluent from stock trucks onto farms.	Environment Waikato, Federated Farmers, Agriculture ITO.	2010/12

Expected results

- Reduced incidents of stock effluent discharges from trucks and trailers reported on the road.
- Effective and efficient disposal of stock truck effluent onto farms.

Reasons

In order to contribute to minimising the spillage of stock effluent from trucks onto roads, **Action 14** states farmers need to accept the effluent that has been collected by the truck while transporting stock to their farms. If the farm does not have existing effluent ponds, a truck with a maximum load of 400 litres of effluent needs approximately 16 square metres of pasture to spread the effluent under current WRP rules, which can be achieved by turning the tap and driving over the paddock. As long as the effluent being disposed will not enter a waterway, and other conditions set out in the WRP are met, no resource consent is necessary. This ensures that all destinations become responsible for stock truck effluent which will also reduce the risk of spills.

In cases of mixed loads, sellers of stock, transport operators and farmers can negotiate how effluent will be disposed of. There may be special circumstances where it is impractical for an individual farmer to allow the disposal of stock effluent on his/her property. In such situations, prior arrangements should be made by the farmer receiving the stock with the transport operator with regard to the appropriate disposal of effluent from that stock.

Action 15 recognises that there are a range of methods that farmers can employ to dispose of stock effluent from trucks. The methods used by farmers will largely depend on their individual situation their equipment and existing facilities, their farm management system, and the frequency and quantity of stock unloaded. Environment Waikato will provide advice on how this should be undertaken in the Waikato region.

Effluent irrigation management system.

Policy 6: That the construction, operation and maintenance of in-transit stock truck effluent facilities be regionally coordinated and that the NZ Transport Agency and territorial authorities contribute funds on a fair and equitable basis.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A16	**Territorial authorities and the NZ Transport Agency (HNO)** to finalise a programme and seek approval for funding from the NZ Transport Agency (RPP) for the development and maintenance of in-transit stock truck effluent disposal sites.	Environment Waikato, the NZ Transport Agency.	Ongoing
A17	**Environment Waikato** to investigate and recommend an appropriate method for the fair allocation of construction and operation costs of agreed in-transit disposal facilities, including those privately operated but made available for general use 24 hours a day, 7 days week.	Territorial authorities, the NZ Transport Agency.	2010/12

Expected results

- A fair and equitable distribution of costs for in-transit disposal facilities regionally.
- An improved network of stock truck effluent disposal facilities throughout the region.
- Reduced incidents of stock truck effluent discharges reported on the road network.

Reasons

Action 16 commits territorial authorities and the NZ Transport Agency to working together to seek the approval of relevant road controlling authorities for funding towards in-transit facilities, as set out in the NZ Transport Agency's Planning, Programming and Funding Manual 2008. The construction of in-transit facilities must be in accordance with this manual (refer Appendix D).

Action 17 commits Environment Waikato to work with territorial authorities and the NZ Transport Agency to determine how the construction costs and the ongoing costs of operation and management of in-transit facilities can be fairly distributed to reflect the benefits which accrue from the regionwide investment. This is a priority action of the strategy.

A typical effluent holding tank arrangement – Wellsford.

Policy 7: That related regional and district strategies and plans, implement the strategy.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A18	That **Environment Waikato** seeks to implement the strategy when reviewing the RLTS, RPS, WRP and any other related plans or strategies, including the Regional Road Safety Strategy.	Territorial authorities, the NZ Transport Agency.	Ongoing
A19	That the **NZ Transport Agency (HNO)** give effect to the strategy when designing improvements to the state highway network.	Environment Waikato, territorial authorities.	Ongoing
A20	That **territorial authorities** seek to implement to the strategy in district plans and growth strategies.	Environment Waikato, the NZ Transport Agency.	Ongoing
A21	That **Environment Waikato** continues to give effect to the Industry Code of Practice and any other related legislation or national strategy when reviewing the strategy.	the NZ Transport Agency, territorial authorities.	Ongoing or via a full review by 2016
A22	**Environment Waikato** to investigate prosecution under the RMA 1991 for reported effluent discharges to road or related receiving environments.	Territorial authorities, RTA.	Ongoing
A23	**The Regional Working Group** to lobby the Ministry of Transport to review the legislative framework for preventing stock truck effluent discharges, including amending the definition of 'insecure load' within the LTA 1998 to include animal waste. The legislative framework should also include the establishment of an enforcement regime.	Federated Farmers, Environment Waikato, NZ Police, Ministry of Transport, NZ Transport Agency	2010/12

Expected results

- More effective recognition of the strategy through RMA plans and policy statements.
- The integration of stock truck effluent issues within and between agencies.
- An improved network of stock truck effluent disposal facilities throughout the region.
- Reduced incidents of stock truck effluent discharges reported on the road network.
- Improved legislation and clearer enforcement options.

Reasons

Due to the importance of managing the environmental effects of stock truck effluent discharges, it is important that key resource management documents recognise the issues and objectives raised in the strategy. While the RPS and the WRP cover these issues they need to do so more explicitly.

Action 18 commits Environment Waikato to implement the strategy when next reviewing the RPS and the WRP. In doing so, consideration can be better given to stock truck effluent disposal when discharge consents are issued or renewed for key destinations (meat processing plants and sale yards). Regard should also be given to the strategy when reviewing the Regional Road Safety Strategy.

National land transport programmes are reviewed every three years and a number of key state highway improvements are being planned. **Action 19** ensures that the NZ Transport Agency are aware of the requirements for a network of in-transit stock truck effluent disposal sites in the Waikato region and the opportunity that exists to provide such facilities, where required, as an integral part of state highway improvements.

Stock truck effluent spillage onto roads is a hazard that may compromise the safety and efficiency of a district's road transport network. Territorial authorities can advocate for the construction of stock truck effluent disposal facilities using the Building Act, Transit New Zealand Act, RMA and LGA.

Action 20 recognises that territorial authorities should, by inclusion of appropriate objectives, policies and rules in district plans, better recognise the adverse effects of stock effluent on the road, plan and require key stock truck destinations to construct stock truck effluent disposal facilities. Under section 9 (land use) of the RMA, territorial authorities can include rules in district plans relating to the construction of stock truck effluent disposal facilities or provide for the construction of facilities through issuing resource consent. Territorial authorities should also have regard to the strategy

when preparing Long Term Plans (LTPs) to ensure that adequate funding is available for the construction, operation and maintenance of required in-transit disposal facilities.

This strategy gives effect to the existing industry code of practice and the North Island strategy. This code is now ten years old and no legislation presently exists that is specific to stock truck effluent. However, should any new national code, legislation or strategy be developed, **Action 21** states that the strategy should be reviewed to reflect any significant changes.

While not preferred, if continual reports of spillage or dumping of stock truck effluent in places other than in-transit disposal facilities are received or if reports continue to be received via **Action 22** Environment Waikato may need to take action under the RMA. Such actions have occurred in other parts of New Zealand. Environment Waikato will investigate this action further.

Legislation presently in place is not specific to stock truck effluent and no one organisation is ultimately responsible for avoiding or minimising discharges of effluent from stock trucks. There are also inadequate enforcement guidelines. **Action 23** provides for Environment Waikato and the Regional Working Group to continue promoting a review of the legislative framework. To improve enforcement, stock truck effluent should be included in the definition of an insecure load, as the effluent is a component of the livestock load. The review should cover all sectors involved with the transportation of livestock, from the preparation of livestock prior to transportation through to the receiving of stock at the destination point.

Policy 8: Regional stakeholders will continue to collaborate on all issues related to stock truck effluent.

Implementation actions

Action no	Actions and lead agencies	Support agencies	Timing
A24	**Environment Waikato** will continue to convene the Regional Working Group meetings to facilitate collaboration amongst key stakeholders.	Territorial authorities, NZ Transport Authority, meat processing plants, sale yard operators, Police, Federated Farmers, RTC Agriculture ITO.	Ongoing

Reason

The regional cooperation which has occurred over the past ten years has been an important element in ensuring that stock truck effluent issues are addressed in a collaborative manner.

The continued good work of this group is essential in giving effect to the strategy and assisting organisations with their responsibilities outlined in the actions.

Action 24 commits Environment Waikato to continued convening and coordinating this group.

A two-grill disposal facility.

Effluent disposal facility at Matamata sale yards.

Targets, funding, references and appendicies

Sale day, Taupo sale yards.

4 Targets

Progress towards the strategy's vision and outcomes is underpinned by the policies and actions detailed in the strategy. Progress will be measured against the following targets, which are based on existing information and data.

Implementation actions

Target no	Targets	Monitoring source	How	Timeframe
T1	The number of reported stock truck effluent complaints reduces on an annual basis.	Environment Waikato, territorial authorities.	Complaints register.	Annually
T2	An increase in the number of meat processing plants with stock truck effluent disposal facilities.	Environment Waikato, the Regional Working Group.	Survey	Annually
T3	An increase in the number of sale yards with stock truck effluent disposal facilities.	Environment Waikato, the Regional Working Group.	Survey	Annually
T4	An increase in the number of farmers standing their stock before transporting.	RTA, cartage companies.	Survey and/or logbook data and livestock recording mechanisms.	Annually
T5	An increase in the number of farmers receiving stock effluent from incoming stock trucks.	Federated Farmers.	Survey and/or logbook data.	Annually
T6	Progressive implementation of in-transit stock effluent disposal facilities.	Environment Waikato, territorial authorities, the NZ Transport Agency.	RLTP and NLTP.	Annually

Morrinsville stock sale day.

5 Funding

Stock truck effluent disposal facilities are located either in-transit, or at destinations (sale yards or meat processing plants). In-transit disposal facilities will be funded by the Road Controlling Authorities (RCAs). Stock effluent disposal facilities at sale yards and meat processors are privately owned and operated, and funding for facilities would be paid for by the individual organisation. In a case where a privately owned and operated facility is made available to in-transit stock trucks, then consideration should be given to developing an agreement to share costs for operation and maintenance with funding assistance from the local authority.

Funding for the construction, operation and maintenance of stock effluent disposal facilities can be eligible for financial assistance through the NLTP. Details for this are provided in Section F10.7 of the NZ Transport Agency's Planning, Programming and Funding Manual and contained in Appendix D.

An issue which may arise, as it has done in the Canterbury region, is where one territorial authority has more than one in-transit stock truck effluent disposal facility, incurring extra costs for operations and maintenance. Some territorial authorities will not have any disposal facilities leaving an imbalance of construction and maintenance expenditure across the region.

The strategy contains an action for Environment Waikato to investigate and recommend an appropriate method for the fair allocation of construction and ongoing costs associated with the operation and maintenance of regionally agreed in-transit disposal facilities.

Stock effluent settling pond located on State Highway 3 near Waverly.

6 Monitoring

In order to determine the effectiveness of the strategy in meeting its objectives and policies, it is important to monitor its implementation. The strategy will be formally reviewed concurrent to future reviews of the RLTS.

Environment Waikato will work with territorial authorities who have responsibility for certain actions so that progress of these is being monitored. This information will be used to report annually on progress regionwide.

Two stakeholder groups will need to be updated on a regular basis:

- the RSTEWG. A bi-annual forum will be held to disseminate information and share successes and issues throughout the region.
- reports providing updates on stock truck effluent will be prepared for relevant Environment Waikato committees.

The following are key indicators which will assist in monitoring the effects of stock truck effluent on the region's roads and the effectiveness of the strategy.

Twin truck wash, Morrinsville saleyards.

Implementation actions

Monitoring action no	Actions and lead agencies	Support agencies	Timing
MA1	Environment Waikato to monitor stock truck effluent complaints.	Territorial authorities, the NZ Transport Agency	Ongoing
MA2	Road Transport Association to monitor and report on the effectiveness of stock truck effluent holding tanks.	Environment Waikato	Bi-annually
MA3	Environment Waikato and territorial authorities to monitor the use and effectiveness of in-transit stock truck disposal facilities.	RTA	Coordinated with other road monitoring programmes
MA4	Environment Waikato and territorial authorities to monitor the availability and effectiveness of disposal facilities at meat processing plants, sale yards and in-transit sites.	Meat processing plants and sale yards	Ongoing
MA5	Federated Farmers to monitor and report on any significant farm management changes that may impact of the regional network of in-transit sites.	Environment Waikato, Agriculture ITO	Periodically
MA6	Environment Waikato to monitor new or renewed resource consents for stock effluent disposal and new consents for meat processing plants and sale yards.	Territorial authorities	Annually
MA7	The Regional Working Group to advocate for a ten year review of the North Island Stock Truck Effluent Strategy Study.	Environment Waikato, territorial authorities, the NZ Transport Agency	2010/12

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Appendix A: Criteria for selecting in-transit sites

Several factors must be considered when looking at where disposal facilities will be located in the Waikato region. Working party members, in consideration of where to locate in-transit stock truck effluent disposal facilities, have had regard to protection matters, location factors, and cost issues.

Protection

There are two issues that must be considered when selecting sites for construction of in-transit stock truck effluent disposal facilities. The issues are stock trucks entering the Waikato region from outside the region and stock trucks travelling within the Waikato region. When selecting potential sites for in-transit stock truck effluent disposal facilities the working party must have regard to the protection of entry points into the region, townships and problem areas, such as steep inclines, blind spots and windy areas.

Location

Location of potential sites must be selected with regard to the main stock trucking routes. Sites will be located in the most strategic positions to provide a facility for stock trucks travelling from numerous routes. Sites will also be located as close as practicable to the road for ease of access. The sites must be considered in relation to each other to assess now the implementation at one site will change another site's location requirements. The sites must also be considered in relation to inter-regional issues, specifically where sites are established, proposed, or required outside of the Waikato region.

Cost

The cost of constructing and maintaining in-transit sites will depend upon site location, type of land, site access, facility design, whether the land needs to be purchased or leased by the road controlling authority, for example. The option of whether suitable land can be utilised must be explored, such as, owned by local authorities or the NZ Transport Agency.

Cross boundary considerations

When selecting the location of in-transit stock truck effluent disposal facilities, consideration has been undertaken of inter-regional requirements.

Planning requirements

Construction of in-transit stock truck effluent disposal facilities (the stock effluent capture and treatment options) will require land use consents from the district council to authorise the use of land. Depending on the treatment system, discharges, either into waterways or onto land, will require discharge permits from the regional council. The district councils and regional council will assist in the acquisition of resource consents.

Funding formula

The funding of in-transit stock truck effluent disposal facilities will be undertaken in accordance with the NZ Transport Agency's Planning, Programming and Funding Manual, 2008.

- The NZ Transport Agency, as a result of inclusion in the road controlling authority land transport programme, may pay 50 per cent of construction costs of effluent disposal infrastructure.
- The territorial authority will contribute 50 per cent of the effluent disposal facilities.
- The NZ Transport Agency may pay the total cost (100 per cent) of any roading improvement works associated with construction of the effluent facility site entrance.
- The relevant territorial authority will provide financial assistance for the maintenance of effluent disposal infrastructure, under the relevant amenity/safety maintenance work category, of the district roading programme at the base rate.
- District councils and the NZ Transport Agency will include provision for financial assistance for the maintenance of associated roading improvement works in relevant state highway or district roading programme.

Appendix B: Key legislation, strategies and plans

Land Transport Management Act 2003 (LTMA)
The LTMA articulates the legislative requirements of NZTS to achieve an integrated, safe, responsive and sustainable land transport system.

Land Transport Act 1998 (LTA)
The LTA is designed to promote safe road user behaviour and vehicle safety, to provide for a system of rules governing road user behaviour, the licensing of drivers and technical aspects of land transport, and to recognise reciprocal obligations of persons involved.

Section 9 of the LTA states that a person operating a motor vehicle on a road, and any person loading that vehicle, must ensure that any load carried in or on the vehicle (or in or on a vehicle being towed), is secured and contained in such a manner that it cannot fall or escape from the vehicle. However the LTA explicitly excludes animal waste from the definition of load.

Resource Management Act 1991 (RMA)
The RMA is New Zealand's overarching environmental legislation. Its purpose, outlined in Section 5, is to *"promote the sustainable management of natural and physical resources"*. The responsibility of implementing the RMA falls largely on New Zealand's regional authorities and territorial authorities. Therefore, all council strategies need to be written in a way that they are in accordance with the purpose and principles of the RMA. This includes the strategy. The definition of contaminant in the RMA is sufficiently wide to include organic material like stock effluent. Section 15 of the RMA is also of note as it is of relevance to discharges.

Local Government Act 2002 (LGA)
The LGA outlines what needs to be included within the Long Term Plan (LTP). LTPs provide a broad overview of what a community wishes to achieve within a ten year time-frame and how councils intend to respond and achieve these outcomes. LTPs are the instrument by which councils allocate funding to implement their community strategies. Included in these strategies are improvements in the local and regional network of stock truck effluent disposal facilities (Environment Waikato 2009).

National policy context

New Zealand Transport Strategy 2008 (NZTS)
The NZTS is a government strategy that looks forward to 2040 and sets out a plan for the transport sector. The 2008 NZTS differs from the 2002 NZTS in that it is target-led. The NZTS itself is not statutory, but it will be given statutory weight in other documents.

The NZTS sets a vision for 2040, which is: *"People and freight in New Zealand have access to an affordable, integrated, safe, responsive and sustainable transport system"*. The following specific objectives are identified:

- ensuring environmental sustainability
- assisting economic development
- assisting safety and personal security
- improving access and mobility
- protecting and promoting public health.

Seven areas of action or interventions are also outlined which will be an important area of focus in order to achieve the targets. These are:

- integrated planning
- making best use of existing networks and infrastructure
- investing in critical infrastructure and the transport sector workforce
- increasing the availability and use of public transport, cycling, walking and other shared and active modes
- considering options for charging that will generate revenue for investment in transport infrastructure and services
- using new technologies and fuels
- maintaining and improving international links.

Government Policy Statement 2009/10 – 2018/19– (GPS)
The GPS describes the government's funding priorities for the next six years, viewing infrastructure and services as an essential part of a robust economy.

B 31 – Short and medium term impacts
A number of impacts noted in the GPS. Stock truck effluent disposal is connected with some of the impacts:

- reductions in deaths and serious injuries as a result of road crashes
- reductions in adverse environmental effects from land transport
- contributions to positive health outcomes.

C 38 – Funding in the National Land Transport Programme is allocated to activity classes. The development and management of stock truck effluent disposal facilities fits into the following activity classes:

- new and improved infrastructure for state highways and local roads
- maintenance and operation of state highways
- transport planning.

C 60 – Regional Transport committees and the NZ Transport Agency should ensure that cost-effective measures to improve the efficiency of existing networks are considered as well as investment in new infrastructure.

C 62 – Most transport problems require the involvement of many government agencies and private sector stakeholders to develop solutions.

North Island Stock Truck Effluent Strategy Study 2003

The North Island Stock Truck Effluent Strategy (North Island strategy) was commissioned by Transit New Zealand to determine a strategic network of in-transit and destination stock truck effluent dumping sites.

Utilising surveys and network modelling the strategy identifies the optimum number of strategic sites for effluent dumping in such a way as to reduce stock truck effluent spillage, increase road user safety and decrease environmental stress.

The North Island strategy makes the key assumption that all destinations (such as farms, sale yards and meat processing plants) will receive stock truck effluent along with the stock delivered to these destinations. This is critical to the success of this strategy and destinations are a critical part of the stock truck effluent disposal network for the North Island.

The strategy also assumes that all trucks have 300 litre effluent holding tanks and that 75 per cent of all stock is stood off green feed prior to cartage.

Based on the busiest day of the year and the above assumption the strategy recommends that North Island in-transit dumping sites be developed as a first priority in the following locations. Those underlined are located within the Waikato region.

- Whangarei
- Wellsford
- Bombay
- Te Kuiti
- Mt Messenger
- Wellington
- Woodville
- Bayview
- Waiouru
- Taumarunui
- Opotiki
- Taupo
- Putaruru
- Katikati

In addition the North Island strategy also recommends two 'Priority 2' sites at Te Ngae and Wairoa and two 'Priority 3' sites at Fielding and Ngaruawahia. This network of in-transit sites is shown in Figure 8.

The NZ Transport Agency treats the North Island strategy as their national strategy with regards to planning and funding.

Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads 1999

This industry code of practice was developed and released by the National Stock Effluent Working Group to develop practices and solutions to reduce the amount of effluent falling from stock trucks onto New Zealand roads.

While this industry code of practice is voluntary it also has the support and cooperation of all stakeholders and sets a national framework for the management of stock truck effluent without the need for compulsory legislation.

The industry code of practice has three basic principles.

- Stock is stood before it is transported.
- Simple and appropriate methods to collect and dispose of effluent from trucks delivering stock are used.
- A coordinated approach is in place to control this problem by good communication between all those directly and indirectly involved with the handling and transportation of stock and the management and disposal of effluent.

The code of practice outlines the 'responsibilities and guidelines' for all stakeholders directly or indirectly involved with the handling and transportation of stock.

Those directly involved are:

- farmers
- livestock carriers
- agents (stock agents and meat processing company agents)
- sale yard operators and owners
- meat processors.

Those indirectly involved are:

- regional council and territorial authorities
- road controlling authorities.

Regional policy context

Regional Land Transport Strategy (RLTS)

The RLTS provides the regional framework for the development of the strategy. The RLTS in giving effect to the Land Transport Management Act 2003 (LTMA) contains nine outcome areas.

The outcomes relevant to stock truck effluent are:

- economic development (of the meat and dairy industry and tourism)
- safety and personal security (for all road users)
- access and mobility (a focus on ensuring accessibility by all modes)
- public health (including managing all discharges from vehicles)
- environmental sustainability (especially to marine receiving environments)
- integration (key focus on integrating transport and land use planning to achieve better integration over all outcomes)
- responsiveness (to industry changes)
- energy efficiency (including ensuring energy efficiency in road transport and any related facilities) (Ministry for the Environment 2007)
- funding (to ensure improvements are able to be fully funded).

Waikato Regional Policy Statement (RPS)

Prepared under the RMA, the RPS promotes the sustainable management of natural and physical resources. It does this by providing an overview of the resource management issues of the region along with providing objectives, policies and methods to achieve integrated management of the regions natural and physical resources (Environment Waikato 2000).

The RPS is particularly concerned with the issue of water quality and the objective of the RPS is a net improvement of water quality across the region both from point and non-point sources of discharge.

The RPS also recognises that Maori consider the disposal of contaminants to water has the potential to diminish the mauri of that water. The disposal of waste is another particular issue identified in the RPS and further states that no pollution from waste disposal is acceptable from a Maori perspective.

The RPS has adopted the international waste management hierarchy as a policy in the RPS[7] being:

- reducing the amount of waste produced
- reusing waste items
- recycling waste materials by reprocessing and using them as raw material for other products
- recovering resources from waste
- residual wastes disposed of safely.

Liquid wastes specifically include treated organic wastes from point source (such as dairy shed effluent) and non treated organic wastes from non point source (such as waste deposited from animals on pasture). The effects of these waste discharges may include:

- oxygen depletion
- nutrient enrichment
- stream siltation
- contamination of surface and ground water
- reduction in the mauri of natural resources.

The RPS states that these effects are to be avoided, remedied or mitigated by producing less wastes and of disposing of those that are generated in a responsible and careful manner.

Waikato Regional Plan (WRP)

The WRP has been developed by Environment Waikato under the RMA and is intended to provide direction regarding the use, development and protection of natural and physical resources in the region.

The WRP is specifically designed to provide direction for the processing of resource consents with regards to water, river and lake beds, land and soil, air and geothermal resources.

[7] 3.9.5 Waste Management Policy One, Waikato Regional Policy Statement.

Of particular relevance to this strategy is the issue of discharge to water both from point sources and non-point sources.

The plan states that water bodies are vitally important to the region and need to be managed in a sustainable manner. The plan also recognises that the interconnectedness of the water system means that poor resource management in one area can impact on a large downstream area.

Unless connecting into an existing town sewage system it is likely that any new in-transit effluent disposal system will need a resource consent under the WRP.

Non-point discharges which could include any thing from inappropriate farming practices to illegal discharges from stock trucks is an issue of the plan.

The objective is to avoid significant adverse effects on aquatic ecosystems, and this will be addressed through a combination of education and encouragement. However, more stringent conditions and standards may be used in regulatory methods in the future, if no improvement in water quality is detected.

Discharges to land can also contaminate soils and can lead to adverse effects on water quality and habitat.

The discharge of wastes and hazardous substances into or onto land can cause the following issues according to the plan:

- contamination of soils with pathogens, heavy metal, pesticides, hydrocarbons and other hazardous substances that can present risks to human heath, and the wider environment, and reduce the versatility and productive capacity of soil
- adverse effects on the significant character of air quality
- contamination of surface water and ground water with substances such as nutrients, and pathogens
- adverse effects on the relationship that tangata whenua as Kaitiaki have with their taonga, such as ancestral lands, water and waahi tapu.

Policy 4 on discharges to land ensures that discharge of contaminants onto or into land maximises the reuse of nutrients and water contained in the discharge.

Some in-transit facilities will discharge to land and will require a resource consent under this plan, while other discharges, for example spraying stock truck effluent onto land will likely be a permitted activity under this plan.

Where an activity breaches this plan (and this could include illegal discharges of stock truck effluent to road sides) Environment Waikato may apply for enforcement orders, issue abatement notices and use other enforcement mechanisms in Part XII of the RMA.

Regional Land Transport Programme (RLTP)

The RLTP is a statutory document prepared under the LTMA. The purpose of this document is to prioritise all of the land transport activities in the Waikato for submission to the NZ Transport Agency for funding. The RLTP for the Waikato region is prepared for the Waikato region by the RTC for approval by the regional council.

The RLTP is then submitted to the NZ Transport Agency for inclusion in the National Land Transport Programme (NLTP). The NLTP identifies government funding for transport activities. If an activity is not included in the RLTP it is ineligible for government subsidy. Combining the land transport activities for the region into a single programme, allows the region to address known transport issues in a comprehensive way, and also allows comparison to be made against national and regional targets for the transport sector. Development of the RLTP requires a collaborative effort between the territorial authorities of the region, the NZ Transport Agency and the regional council and is prepared every three years.

Environment Waikato consulted on the draft RLTP 2009-2012 in May 2009. The final programme was adopted by the Regional Transport Committee (RTC) in June 2009. The implementation methods and actions from the strategy will be reflected in the next RLTP review which is scheduled in 2011/12.

Long Term Plan (LTP)

The LTP is prepared under the LGA, by the regional council every three years, and contains planning and financial information for the next ten years. The LTP describes how the council will deliver the outcomes agreed to by the community in respect to social, economic and environmental wellbeing, and the council's intended contribution towards those outcomes. Of particular relevance to stock truck effluent strategy is the provision of in-transit projects and funding for relevant local authorities.

Other key national and regional policies and plans

Planning for stock truck effluent in the Waikato fits into the broader context of national and regional strategies. This section outlines other key national and regional policies, and local strategies and linkages with the strategy.

New Zealand Transport Agency Planning, Policy and Funding Manual 2008

The purpose of the manual is to set out in a transparent manner for all stakeholders:

- a summary of the legislative and strategic context, within which the NZ Transport Agency and approved organisations are required to operate
- how the NZ Transport Agency will assist and advise approved organisations to formulate activities and combinations of activities that meet the statutory and policy requirements placed on the NZ Transport Agency and approved organisations
- the NZ Transport Agency policies and procedures for preparing, scrutinising and assessing activities or combinations of activities, and allocating and managing land transport funds
- how the NZ Transport Agency uses the provision for combinations of activities, groups of similar lower-cost activities and programmes of ongoing activities
- the arrangements the NZ Transport Agency will use for monitoring, auditing and reporting on the land transport system, outcomes from the NLTP and implementation of approved activities.

Waikato community outcomes

Environment Waikato has developed a series of community outcomes as part of its 2006-2016 LTP. The purpose of the community outcomes is to outline what Environment Waikato seeks to achieve in the next ten years. The community outcomes are summarised below.

Sustainable environment	The Waikato region values and protects its diverse, interconnected natural environments.
Quality of life	The Waikato region is a great place to live, providing the services and opportunities we need to live well.
Sustainable economy	The Waikato region balances a thriving economy with looking after its people, places and environment.
Culture and identity	The Waikato region identifies with – and values – its land, air, rivers and waterways, mountains, flora, fauna and its people.
Participation and equity	The Waikato region builds strong informed communities and has a culture that encourages people and communities to play their part.

Appendix C: Stakeholders directly and indirectly involved in stock truck effluent

The movement of stock from farms to other destinations, or in-transit involves a number of parties directly and indirectly, suggesting a shared approach is needed to reduce effluent spillage on the roads. The Industry Code of Practice (1999) identifies a number of parties with a role to play.

Roles of the parties directly involved

Federated Farmers

Federated Farmers of NZ (Inc) have been involved in providing advocacy and advice to farmers to help eliminate and reduce stock truck effluent.

Federated Farmers are a member of the National Stock Effluent Working Group and a member of the Regional Working Group. As part of their responsibility under the code of practice, the Regional Working Group actively advocates to farmers to stand stock off green feed for a period of four to twelve hours prior to transportation.

Farmers

The farmer, or farmer's agent, is ultimately responsible for ensuring that stock is adequately prepared for transportation by standing the stock off green feed for a period of 4-12 hours prior to transporting. The code of practice (Section A1.2), states that farmers should take responsibility for the receiving of, and disposal of, effluent collected on trucks from stock being delivered onto their property. This can be achieved by either disposing the effluent directly into a farm dairy effluent treatment system, or discharge to land where the discharge does not result, or is liable to result, in any of the effluent entering nearby waterways.

Generally, farmers endeavour to stand their stock off green feed for a minimum of 4 hours. However, there are a number of reasons why this might not happen. In a survey conducted by Environment Waikato at the 2008 Fieldays, farmers offered the following reasons on why they did not stand their stock.

- Not enough notice given by the truck companies to stand stock off green feed. For example the farmer may be given notice by the truck company or livestock agent the night before for an early morning pick up.
- Not enough notice given by livestock agents.
- Some farmers think they will receive a higher price at the meat processing plants for a fresh kill, by not standing their stock off green feed.
- Some farmers noted they had no 'standing pads' or stock yards to hold the stock.
- Some are worried that if they do get their stock in to stand off pasture, that the truck may be significantly delayed the next day.
- No water troughs in the yards or 'standing pads'.

There is also farmer resistance when receiving stock effluent from an incoming truck. Not all farms have an effluent disposal system, and there is an increased concern from farmers about the potential for the introduction and spread of disease.

Stock agents

Stock agents, including meat processing company agents and stock purchasers, are responsible for communicating with clients (farmers) the requirements for standing stock, transporting stock and receiving stock.

Stock agents must ensure that arrangements for stock collection are finalised well in advance and that farmers are adequately notified, either directly or via the transport operator, of stock collection times to allow farmers to stand stock for at least four hours prior to transportation.

Another industry that is largely overlooked is that of grazing companies. As dairy farms and dry stock farms become more intensified, farm management systems are embracing the off-farm grazing concept. The notion of a self contained farm is becoming rarer, where all stock is kept and managed on the farm which includes lactating cows, weaners, yearlings, or older dry stock with no off-site grazing. More modern practices refer to the farm as the 'milking platform' and favours the milking cows only, with most other stock being transported to off-site grazing. Grazing locations are largely chosen on price and quality of the grazing, as there are variations in the quality of grazing. Many farmers transport their in-calf cows up to ten weeks prior to birth to rest grazing on the main farm.

With so much off-site grazing comes short and long haul transportation. There are approximately four million dairy cows in New Zealand, one million of which are located in the Waikato region.

Calculation for the Waikato

Farmers commonly retain 25 per cent of their heifer calves (weaners) for herd replacement, plus last year's weaners (25 per cent). With approximately 90 per cent of farms now

grazing off-site, this means large numbers of stock are being transported. It is estimated that there would be approximately 100,000 (one hundred thousand) truck movements per annum to transport only grazing stock. Grazing stock size and weight ranges from fully grown to weaner size, which will determine stock numbers for transportation.

Livestock carriers

Livestock carriers are responsible for collecting and containing effluent from stock on all trucks and trailers. This is mostly achieved with holding tanks fitted to the trucks to collect effluent to ensure that spillage is minimised. Approximately 97 per cent of commercial stock trucks and trailers in the Waikato region are fitted with holding tanks, and are automatically fitted on all new trucks. The only trucks not fitted with holding tanks are smaller privately owned trucks. Taranaki Regional Council (2001) notes in their Regional Stock Truck Effluent Disposal Strategy that all commercial trucks have been fitted with holding tanks. Willis, 2001 (cited in Taranaki Regional Council, 2001) noted that 81 per cent of stock trucks and 99 per cent of trailers are fitted with stock effluent holding tanks in the Manawatu-Wanganui region. Similarly the Bay of Plenty region has similar percentages of trucks fitted with effluent holding tanks.

Livestock carriers should ensure that they have sufficient notice of transport requirements so they can plan work and comply with planned pick-up schedules. This will ensure operators allow appropriate time for farmers to stand stock off green feed.

During transportation, any effluent generated in-transit is the responsibility of the stock truck operator. Stock trucks should be able to deliver both the stock and the effluent generated from that stock at all destinations.

A truck operator can be prosecuted for discharging or spilling effluent onto the road, roadside or into a water body, therefore it is in the best interests of the operator to ensure that sufficient notice is provided to farmers of collection times.

Stock trucks returning to cartage company yards may have full effluent holding tanks, which, if not emptied, can cause odour, aesthetic, and water quality problems on site. Such effects are addressed under the RMA and cartage companies are required to install facilities to dispose of effluent from stock trucks. All cartage companies in Taranaki have licensed effluent disposal facilities in yards.

Sale yard operators

Sale yards can contribute to reduce stock effluent spillage on the roads. It is estimated that two million stock units pass through the Waikato region each year. A proportion of these will be passing through, others transported to farms or meat processors.

It is likely that stock trucks will arrive at a sale yards with a full effluent holding tank, which if not emptied can cause odour, aesthetic and water quality problems on site. The problem is compounded if there is no stock truck effluent disposal facility at the sale yards, where the same trucks will make return trips with more stock and the truck holding tank is still full.

Sale yards should have, and make available, facilities to receive and appropriately dispose of stock effluent from stock being delivered to their premises.

Currently three sale yards operating with stock effluent disposal facilities in the Waikato are located at Tuakau in Franklin district, Taupo in Oranui Road, north of Taupo and Matamata on the edge of the town. Morrinsville sale yards has a twin truck wash only facility, and a single truck wash facility in Otorohanga at an independent site. Te Kuiti sale yards in the Waitomo district, are in the process of applying for a disposal facility.

In conjunction with stock agents, sale yard operators should ensure that arrangements are finalised well in advance and that their clients are notified, directly or via the transport operator, so that their clients are able to stand their stock for the appropriate period before transportation.

Sale yard location	Stock effluent disposal facility
Tuakau	Yes
Paeroa	No
Morrinsville	No
Frankton	No
Te Kuiti	No
Cambridge	No
Te Awamutu	No
Matamata	Yes
Taupo	Yes

Meat processors

Meat processors have a responsibility to communicate with their clients on requirements for stock effluent management, including standing stock off green feed, transporting stock and receiving stock.

Meat processors should communicate with clients the following benefits of standing stock before trucking:

- less stress
- clean stock for processing
- little carcass weight loss as long as water is available while stock is held off green feed.

Fresh clean water should be available at all processing facilities and animals are given time to rehydrate after trucking. This will minimise any suggested weight loss.

It is likely that stock trucks will arrive at a meat processors with a full effluent holding tank, which if not emptied can cause odour, aesthetic and water quality problems on site. The problem is compounded if there is no stock truck effluent disposal facility, or truck wash facility at the meat processing plant. Such effects are addressed under the RMA and meat processors may be required to provide and make available facilities to receive and appropriately dispose of stock effluent from stock being delivered to their sites.

There are nine meat processing facilities in the region.

Meat processor	Truck wash	Effluent disposal facility
AFFCO, Horotiu, north Hamilton.	Yes	Yes
Greenlea Premier Meats, Hamilton.	Yes (closed off)	No
Greenlea Premier Meats, Morrinsville.	No	No
Ruakura Abattoir, Hamilton.	No	Yes
Wallace Corporation, Waitoa.	No	Yes
Silver Fern Farms, Te Aroha.	Yes	Yes
Silver Fern Farms, Paeroa.	Yes	No
Universal Beef Packers, Te Kuiti.	Yes (closed off)	Yes (closed off)
Te Kuiti Sheep Meats or Te Kuiti Meat Processors.	Yes (closed off)	Yes (closed off)

Roles of the parties indirectly involved

No single organisation is totally responsible for addressing stock truck effluent issues in the Waikato. There is no legislation specific to stock effluent spillage, nor is it mandatory for stock trucks to have effluent holding tanks on their trucks. However, there are key parties indirectly involved with roles and responsibilities for stock truck effluent issues.

New Zealand Road Transport Forum (RTF)

The Road Transport Forum New Zealand is the authoritative voice of the road transport industry in New Zealand, created to responsibly promote and advance the interest of the road transport industry and its member road transport operators.

The forum is made up of seven constituent associations, one of which is Waikato (No 2 region). The forum has several roles, three of which are:

- represent trucking businesses on local and regional issues throughout the country
- provide practical and authoritative advice on establishing and running a transport operation, including technical services to keep their members well equipped to deal with a constantly changing business environment
- advise on complying with local bylaws and central government rules and legislation.

Local authorities

The Industry Code of Practice (1999) notes the following roles and responsibilities for district councils and regional councils.

District councils

District councils are the road controlling authorities for local roads, and as such are responsible for planning, constructing and maintenance of local roads. All 12 district councils in the Waikato region are members of the Regional Working Group.

District councils have the following roles and responsibilities:

- work with stakeholders involved with the handling and transportation of stock
- can apply for funding subsidy to operate in-transit stock effluent disposal facilities
- identify suitable in-transit sites
- issue land use consents.
- consider the effect of road design on the ability of stock cartage vehicles to contain stock effluent when building and repairing roads
- with the NZ Transport Agency (HNO), development of in-transit sites on the state highway network
- with the NZ Transport Agency (RPP), provide funding assistance for construction and maintenance in accordance with the PPFM.

Regional council – (Environment Waikato)

Environment Waikato is the facilitator of the Regional Working Group. The council also has responsibilities under the RMA and the LTA 2008. Environment Waikato has the following roles and responsibilities:

- coordinator and facilitator
- work with the industry to establish, where and if appropriate, the most suitable siting of in-transit dumps while minimising the number and cost of such in-transit dump sites, should they be required
- work with those people involved with the handling and transportation of stock and with roading authorities to help promote the basic principles of the code
- promote the code of practice
- assist with education to stakeholders
- be an authority for the RMA
- establish fair method of cost sharing
- assist territorial authorities with funding applications
- work with farmers in the development of solutions for the safe on-farm disposal of effluent from stock trucks recognising the relatively small quantities that should be involved
- in particular, regional councils should consider ways to minimise regulation when preparing policies and rules that will affect the on-farm disposal of stock effluent from trucks in their region, such disposal could be provided for as a 'permitted activity' (with conditions if necessary)
- work with the industry to establish, where and if appropriate, the most suitable siting of in-transit dumps while minimising the number and cost of such in-transit dump sites, should they be required (14.12)

Appendix D: The Policy Planning and Funding Manual – requirements for stock truck effluent facilities

F10.7 Stock-truck effluent facilities

Introduction
The following policy applies where an RCA has requested funding assistance for the provision of a stock effluent disposal site.

Note: The agreement of the co-funders of the disposal site must be confirmed in writing before an application for funding is made.

Policy principle
Stock effluent disposal sites are funded under the principle of exacerbator pays. The National Land Transport Fund (NLTF) component is recognition of the willingness to pay by the general monitoring public for the prevention of effluent spillage that is seen as a nuisance and a potential hazard. An additional benefit is the safety benefit gained from the construction of the wide sealed area, where any vehicle may safely move off the road if they need to.

The ultimate exacerbator is the original owner of the stock who benefits from the sale of that stock for processing. There is no cost-effective method of levying this from the stock carried. Therefore, local rates paid to either the relevant territorial authority or the relevant regional council, or both, is considered a fair method of raising an appropriate proportion of the construction cost.

Conditions of funding assistance
The cost of any stock effluent disposal facility is eligible for funding assistance under work category 321: traffic management for construction of a facility or under work category 221: environmental renewals for renewal of a facility, subject to:

- the facility being part of an agreed current regional or national strategy
- the relevant territorial authority agreeing to maintain the stock effluent disposal infrastructure, including disposal of any stock effluent
- the facility being situated as close as practicable to the road
- a formal lease, or an agreement to occupy, being signed where the stock effluent disposal facility is not part of the road reserve, giving access to the facility as if it were a road.

Funding assistance rate for stock effluent disposal facilities
The funding assistance that will apply to the total project, regardless of the facility being alongside a local road or a state highway, shall be calculated on the following basis:

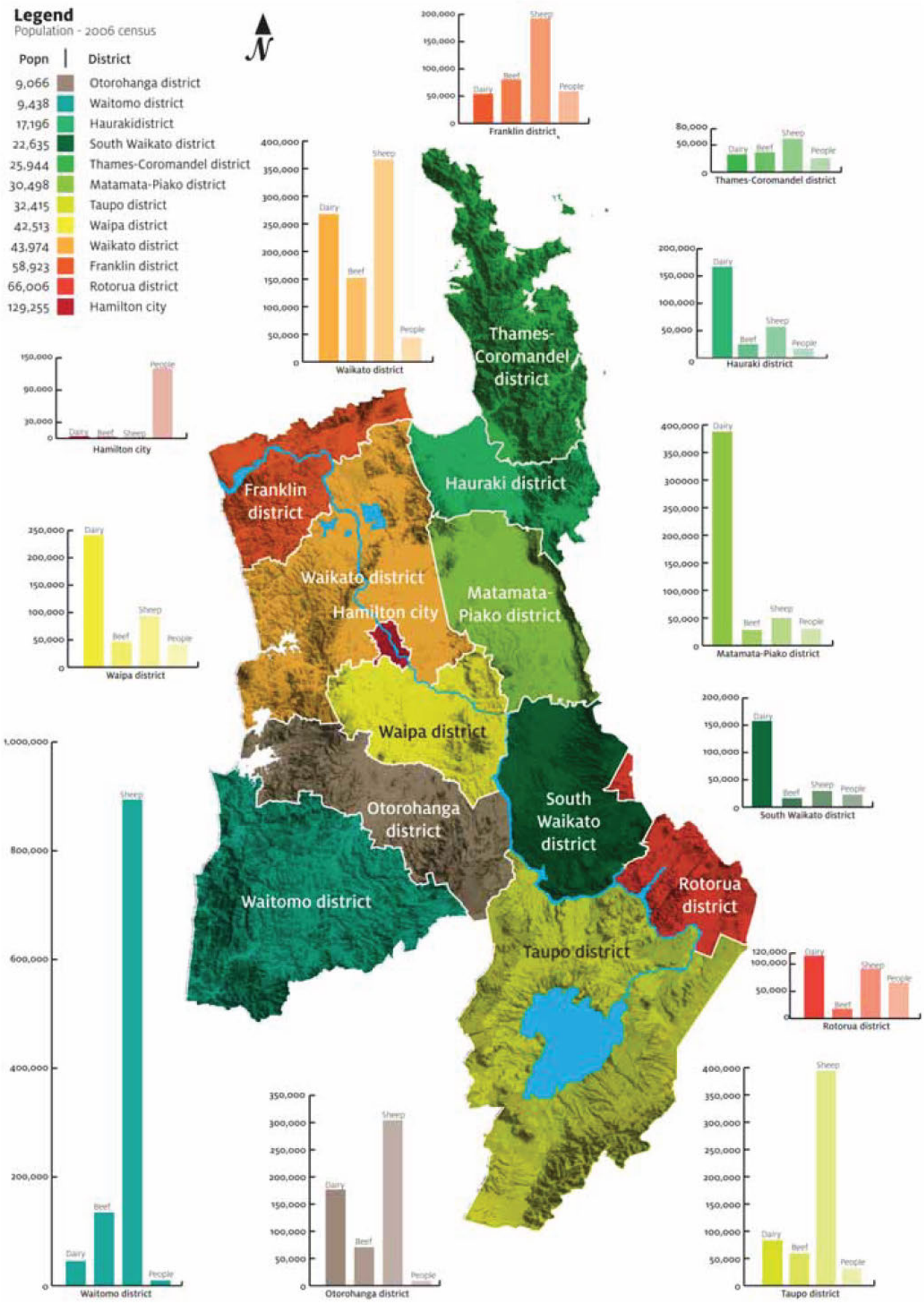
- 50 per cent of the cost of the construction or renewal of the stock effluent disposal facility
- 100 per cent of any necessary road improvement works to enable vehicles to safely enter and exit the disposal facility.

Note: If the facility is on a local road but is identified within the RLTS as being a strategic site, it will also be eligible for 100 per cent of the roading improvement costs within the RLTP.

Maintenance of stock effluent disposal facilities
Maintenance of stock effluent disposal facilities (including disposal of stock effluent from the facility) is eligible for funding assistance under work category 121: environmental maintenance, and is funded at the relevant territorial authority base rate.

Maintenance of associated roading improvement works is eligible for funding assistance under the relevant district or state highway part of the RLTP.

Appendix E: Regional population and stock numbers



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A Practical Guide to Providing Facilities for Stock Effluent Disposal from Trucks

Stock Truck Effluent Disposal

Fourth Edition 2013

Road Controlling Authorities Forum (NZ) Inc

National Stock Effluent Working Group

Acknowledgements:

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Disclaimer

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Cover Picture:

Photo taken at the opening of the Kauri - Stock Truck Effluent Disposal Facility (Whangarei, Northland): Photo courtesy of Opus International Consultants.

Contents

1	**EXECUTIVE SUMMARY**	**5**
2	**INTRODUCTION**	**6**
2.1	Aims of the Guide	6
2.2	Intended Audience	6
3	**AN OVERVIEW TO STOCK EFFLUENT MANAGEMENT**	**7**
3.1	What Is Good Practice?	7
3.2	Truck Effluent Tanks	7
3.3	Why Are Collection Facilities Necessary?	8
3.4	Can Deliberate Spillage Result in Prosecution?	8
3.5	How do I Determine the Extent of the Problem?	9
3.6	What Types Of Disposal Sites Are There?	10
3.6.1	Destination Sites	10
3.6.2	In-Transit Sites	10
3.6.3	What's Been Developed So Far?	10
4	**FUNDING A STOCK EFFLUENT FACILITY**	**12**
4.1	Funding Assistance Opportunities	12
4.2	Funding Reference Manuals	13
4.3	Funding for Investigation and Design	13
4.4	Funding for Construction	13
4.5	Funding for Operation & Maintenance	14
5	**LEGISLATION & REGULATIONS**	**15**
5.1	Resource Management Act 1991	15
5.2	Regional Council Requirements	16
5.2.1	Discharge Consents, Land Disturbance and Water Permits	16
5.3	Territorial Authority (City or District Council) Requirements	16
5.3.1	Land Use Consent	16
5.3.2	Designations	17
5.4	Resource Consent Requirements	18
5.5	Building Act	19
5.6	Health and Safety in Employment Act 1992 (HSE Act)	19
5.6.1	Road and Site Safety	20
5.6.2	Effluent Storage	20
6	**SITE SELECTION**	**22**
6.1	Regional or Macro Criteria	22
6.2	Local or Detailed Criteria	23
7	**DESIGN CONSIDERATIONS**	**25**
7.1	Separation of Waste Streams	25
7.2	Site Access	25
7.4	Signage & Road Marking	28
7.5	Truck Receptor Approach Area	29
7.6	Manoeuvring and Turning Paths	30

7.7	Receptor Design	31
7.8	Tank Based System	34
7.9	Sewer Based System	36
7.10	Pond Based System - Reference Documents and Design Accreditation	37
7.11	Utility Connections	38
7.12	Lighting	38
7.13	Remote Telemetry Monitoring	38
8	**EFFLUENT TREATMENT OPTIONS**	**41**
8.1	What Are The Effluent Characteristics?	41
8.2	What Volume Should Be Expected?	42
8.3	What Are The Available Effluent Treatment Options?	44
8.4	What Are The Disposal Options For Treated Effluent?	44
9	**OPERATION AND MAINTENANCE**	**46**
9.1	Stock Effluent Treatment and Disposal - Asset Owner's Manual	46
9.1.1	Introduction	46
9.1.2	Construction/Contractual Phase	46
9.1.3	Operation and Maintenance Activities	46
9.1.4	Health and Safety Overview	47
9.1.5	Maintenance, Capital and Depreciation Costs	47
10	**ON FARM EFFLUENT DISPOSAL**	**49**
10.1	Accepting Effluent On-Farm	49
10.1.1	On-Farm Disposal Methods	50
10 2	Consent Requirements	50
11	**MEAT PROCESSING INDUSTRY EFFLUENT DISPOSAL**	**51**
11.1	Disposal Methods	51
11 2	Consent Requirements	52
12	**REFERENCES**	**54**
13	**APPENDICES**	**56**
A	Good Practice Reminder - Concrete Storage Tank Option	56
B	Good Practice Reminder - Pond Based Treatment Option	57
C	Map of Disposal Facilities - Built Network (as at Oct 2013)	58
D	Map of Disposal Facilities - Planned (as at Oct 2013)	60

List of Figures and Tables

FIGURE	DESCRIPTION
1	Checking consent compliance, Glengarry Hill STEDF – Photo: Opus
2	Pond Water Testing (Glengarry Hill STEDF) – Photo: Opus
3	Murchison SH6 STEDF _ Photo: Google Street View (Opus)
4	Glengarry Hill SH5 STEDF – Photo: Google Earth (Opus)
5	Information Sign – Photo: Opus
6	Human Waste Sign – Photo: Opus
7	Plan of north bound truck approach and receptor, Glengarry Facility – NZTA/Opus
8	North bound truck approach, Glengarry Facility – Photo: Opus
9	Kauri STEDF (Northland) Precast receptors being constructed 2012 – Photo: Opus
10	Kauri STEDF (Northland) Precast receptors finished in place, 2012 – Photo: Opus
11	Glengarry Hill SH5 Cast In-Situ receptors being constructed, 2010 – Photo: Opus
12	Glengarry Hill SH5 Cast In-Situ receptors constructed, 2010 – Photo: Opus
13	Concrete Tank Construction – Photo: Opus
14	Fibreglass Tank – Photo: Opus
15	Glengarry Hill STEDF, Pond Construction early 2010 – Photo: Opus
16	Murchison Telemetry Monitoring System, Graph of monthly results – TDC/MWH
17	Murchison Telemetry Monitoring System, Graph of daily results – TDC/MWH
18	Waiotahi (Opotiki) Telemetry Monitoring System - Opus
19	Maintenance cleaning (Glengarry Hill STEDF) – Photo: Opus
20	Pond Water Testing (Glengarry Hill STEDF) – Photo: Opus
21	Solids Extraction Unit – Photo: IPENZ PN27
22	Gisborne (Matawhero) STEDF, Receptor Construction Sept 2013 – Photo: Opus
23	Murchison SH6 STEDF Constructed, 2007 - Photo: Opus
TABLE	**DESCRIPTION**
1	Typical Effluent Characteristics
2	Glengarry Hill STEDF Truck Volumes

Glossary of Terms

TERM	DEFINITION
AEE	Assessment of Environmental Effects
AOM	Asset Owner's Manual
BA	Building Act (2004)
BOD	Biochemical Oxygen Demand
FAR	Funding Assistance Rate
FDE	Farm Dairy Effluent
HSE	Health and Safety in Employment Act (1992)
IPENZ	Institute of Professional Engineers New Zealand
LA	Local Authority
MOTSAM	Manual of Traffic Signs and Markings
NAMS	New Zealand Asset Management Support
NLTF	National Land Transport Fund
NLTP	National Land Transport Programme
NSEWG	National Stock Effluent Working Group
NZBC	New Zealand Building Code
NZRTA	New Zealand Road Transport Association
NZTA	New Zealand Transport Agency
PIKB	Planning and Investment Knowledge Base (2011)
RC	Regional Council
RCA	Road Controlling Authority
RMA	Resource Management Act (1991)
RTF	Road Transport Forum
STEDF	Stock Truck Effluent Disposal Facility
TRC	Taranaki Regional Council
WRC	Waikato Regional Council
WWTP	Waste Water Treatment Plant

Executive Summary

This guide has been developed on the underlying principal that:

"THE DISCHARGE OF STOCK EFFLUENT FROM TRUCKS ON ROADS IS NOT "SOME-ONE ELSE'S PROBLEM", IT IS THE RESPONSIBILITY OF EVERYBODY INVOLVED TO PLAY THEIR PART." [1]

The National Stock Effluent Working Group (NSEWG) offers support to those wanting to develop and run a Stock Truck Effluent Disposal Facility (STEDF). Part of that support is providing practical and easily readable guidelines based on the latest best practice procedures. This document aims to be that guide, interacting with the reader and informing them of the key aspects to consider and be aware of during the planning, construction and operational phases of a STEDF.

This revised practical guide has been developed by the NSEWG as a replacement to the previous 2005 document. It focuses on latest trends, recent research and development undertaken over the last few years.

This guide focuses on:

- Why facilities are needed
- What types there are ('Destination' and 'In transit')
- What facilities have been built so far and what is proposed
- The funding options for both construction and on-going maintenance
- Legislation and regulations to be considered and applied
- Site selection and design criteria
- Treatment options, operation and maintenance.

Considering the components above, construction costs can range from $200,000 to $400,000 with variances primarily due to the collection method (tank/pond/sewer), the means of effluent treatment, the road or access improvements identified and the need to purchase land.

The process of developing a STEDF can take many years. It is the working group's expectation that these updated national guidelines will help to streamline the future planning and construction of facilities that will lead to less effluent spillage on our country's roads. This will, in turn, reflect favourably on the reputation of not only the transport companies but the agricultural industry as a whole.

[1] *NSEWG (1999)* Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads

2 Introduction

2.1 Aims of the Guide

The NSEWG was first established by the Road Controlling Authorities (RCA) Forum in 1997. Its objective was to bring together all the appropriate industry groups involved with the movement of stock in order to develop practices and solutions to reduce the amount of effluent falling from stock trucks on to New Zealand roads. This guide is part of that objective as it focuses on the planning and implementation of any given effluent disposal facility, and should be read in conjunction with the supporting document 'Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads' also published by the NSEWG.

The NSEWG's principal focus is to ensure there is a nation-wide network of effluent disposal facilities, both in-transit (in between stock truck origins and destinations) and at destination points (such as meat processing facilities and stock sale yards). To date the NSEWG has undertaken New Zealand-wide communication in an attempt to ensure that all parties understand and fulfil their roles.

The aim of this guide is to help the reader understand:

- Why facilities are needed, and what is being done nationally
- The issues and challenges involved in establishing a stock effluent disposal facility
- The funding options for both construction and on-going maintenance.

This guide should be used for reference purposes only. Each STEDF site is unique and although some aspects of best practice (for example the receptor grill, concrete surround and road signage) can be directly applied, the overall construction and on-going maintenance will depend on site specific factors where tailored detailed design will be required to ensure long term efficiencies.

2.2 Intended Audience

This guide is designed to help in the planning and implementation of stock truck effluent facilities within New Zealand and is intended to be used as a reference by:

- Regional Council (RC) and Local Authority (LA) staff
- Road Transport Operators
- Meat Processing and Sale Yard Operators
- Consultants
- Contractors, and others involved in the animal effluent collection industry.

An Overview to Stock Effluent Management

3

3.1 What Is Good Practice?

Good practice may be defined as "a level of effort that seeks to meet industry expectations and typically exceeds minimum compliance requirements" [2].

In this context good practice seeks **"TO MINIMISE THE AMOUNT OF STOCK EFFLUENT THAT SPILLS ON PUBLIC ROADS FROM STOCK TRUCKS BY EFFICIENTLY AND EFFECTIVELY CO-ORDINATING AND MANAGING THE STANDING AND TRANSPORTATION OF STOCK, THE CONTAINMENT OF EFFLUENT WHILE IN TRANSIT AND THE DISPOSAL OF COLLECTED EFFLUENT.[3]"**

In order to meet key operational good practice outcomes, Stock Truck Effluent Disposal Facility (STEDF) must:

- Meet RC, LA, RCA, Building Act (BA) rules and comply with consent conditions
- Ensure safe passage of not only vehicles using the facility but also other road users
- Minimise adverse environmental effects
- Allow for on-going operational and maintenance requirements and have appropriate containment sized for the volume of effluent to be collected
- Meet its intended use and have durability and serviceability requirements to meet the required life expectancy
- Provide a clear documented trail of accountability for the respective suppliers and the components they provided (that is: equipment and products) that were incorporated into the construction of the STEDF works.

3.2 Truck Effluent Tanks

In 1991 the Road Transport Forum (RTF) introduced a voluntary programme for fitting effluent holding tanks to livestock truck and trailer units. In 1997, a quality assurance scheme was introduced for livestock carriers whereby effluent holding tanks became mandatory equipment for RTF members. Although the fitting of tanks is not a legal requirement, all new truck and trailer units owned by members are now fitted with holding tanks for livestock effluent, with total holding capacity ranging between 200-300 litres.

Holding tanks have a finite capacity and once full, effluent overflows onto the road.

[2] *IPENZ (Sept 2011) Practice Note 21: Farm Dairy Effluent Pond Design and Construction*

[3] *NSEWG (1999) Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Road*

3.3 Why Are Collection Facilities Necessary?

Roads are one of the country's biggest assets, so it should be the aim of all RCAs to protect and maintain them to a high standard wherever possible by encouraging correct and responsible disposal of stock truck effluent. This, in turn, will mitigate issues typically associated with effluent spillage and dumping such as:

- Potential safety hazards to smaller vehicles, motorbikes and cyclists undertaking cornering and braking manoeuvres
- Damage to the road surface caused by effluent
- Pollution of local waterways and sensitive environments
- Loss of amenity values at roadside pull-over areas
- Health hazard concerns.

The problem of spillage of stock effluent from trucks transporting livestock has been around for many years. Most councils with significant rural areas and those that are on main transportation routes have particular sites that are well known for accidental effluent spillage. These sites often include sharp bends, steep hill sections, street intersections and roundabouts. However in many cases blatant or deliberate dumping of effluent by stock truck drivers is occurring with a resulting detrimental effect on the roadside environment.

Typical situations include:

- Layby areas/wide shoulders
- Road maintenance stockpile sites
- Hill climbs while on the move
- Local roads both sealed and unsealed when a truck turns off the main highway.

These issues are in part caused by driver behaviour, however, due to the closure of smaller stock sale yards and the centralising of meat processing facilities the trucks are taking longer journeys over greater distances .The changing pattern of stock movements needs to be taken into account when planning effluent collection facilities.

3.4 Can Deliberate Spillage Result in Prosecution?

The NZTA Road and Traffic Standard (RTS16) "Guide for heavy vehicle management" offers assistance on whether prosecutions can arise from effluent spillages.

The definition of what constitutes a "Load" largely determines how the law can be applied. Under the "Land Transport Act 1998", waste which is discharged by animals being carried on a vehicle, is excluded from the definition of "Load". This definition also applies to most other Land Transport legislation. So it is difficult for the NZ Police to bring about a prosecution against a driver whose vehicle discharges animal waste.

On the other hand it is also recognised that the driver of a livestock truck without livestock that is heading back to the yard after delivering animals, can be prosecuted for discharge of effluent onto the road from either the tray or holding tanks. In this regard effluent is considered a "Load".

3.5 How do I Determine the Extent of the Problem?

In order to correctly assess the scale of an effluent spillage problem research needs to be undertaken that will help identify the extent and nature of the issue. Consultation with key stake holders (including the RCA, LA and RC), and the examining of historic records (such as public complaints, maintenance and emergency operations) are viewed as an essential part of providing a true picture of the situation and may also help identify potential solutions.

Often local perception of the issue can get in the way of providing a practical solution, so identification of stock movement routes and volumes between source and destination regionally must be one of the first things considered when building a case for a one-off facility or network of facilities. A survey of New Zealand Road Transport Association (NZRTA) members (livestock carriers) can often provide a great insight into truck movements, stock numbers transported and extent of the effluent spillage problem.

Summary of information sources:

- Public Complaints
- Maintenance operations (Contractors/Consultants RCAs)
- Emergency operations (Police, Emergency services)
- Survey of NZRTA members.

After collating the information it will become clear as to whether the spillage is:

- A generalised problem of spillage throughout the district
- Centred around principal transportation routes
- Known at one or two specific locations
- The result of substandard road curvature and/or super-elevation application, where road realignment may remove or reduce the problem.

Based on this information the scale of the spillages can be plotted on a map thereby helping to identify the most prevalent areas. Assessment against the national strategic network and previous models can then be carried out and site specific options can be developed. Refer to Section 6 for detailed site selection criteria.

3.6 What Types Of Disposal Sites Are There?

Stock Effluent Disposal Sites Can Generally Be Divided into Two Groups: Firstly 'Destination Sites' and Secondly 'In-Transit Sites'.

3.6.1 Destination Sites

These disposal sites are usually located at truck destinations such as: saleyards, meat processing facilities, farms, and ferry terminals where trucks deliver stock or visit in the normal course of their work. Provision of effluent disposal facilities at all destination sites would result in a significant reduction in effluent on roads and would likely minimise the number of 'In-Transit Sites' required.

The establishment of destination stock effluent disposal facilities is based on the principle that the recipient of the stock should also receive their waste and be responsible for its disposal, as promoted in the NSEWG 1999 "Industry Code of Practice for the Minimisation of Stock Effluent Spillage from Trucks on Roads".

3.6.2 In-Transit Sites

'In-Transit Sites' are usually located on major transport routes (typically state highways) to target stock trucks on long haul journeys. They provide the driver with a convenient opportunity to empty effluent storage tanks en-route, lessening the risk of the tanks becoming full and overflowing before reaching the destination.

Refer to Section 6 for guidelines on how to assess where to locate an 'In-Transit Site'.

3.6.3 What's Been Developed So Far?

Since the initial effluent disposal facilities were constructed in the Waikato at Putaruru and Tapapa in 1995, over 31 In-Transit sites have been built and another 30 are in various stages of investigation and design around the country.

Refer NSEWG Map of Disposal Facilities for locations and status of facilities.

www.rcaforum.org.nz/map-of-disposal-facilities/

The placement and installation of stock effluent disposal sites around the country has been based on the findings of an initial South Island study carried out in 1999 and a follow up North Island study in 2003. The studies as outlined below promoted a national framework of preferred sites that aligned with the aims and goals of the NSEWG.

Study details:

Thull JP (Sept 1999) Management of Stock Effluent Spillage from Trucks in New Zealand (Lincoln University) focusing on the south island
researcharchive.lincoln.ac.nz/dspace/handle/10182/778

OPUS International Consultants (Oct 2003): North Island Stock Truck Effluent Strategy Study Network Modelling Results
www.rcaforum.org.nz/north-island-stock-effluent-modelling-study/

These studies brought together the results of a number of smaller independent studies carried out by Regional and District Councils in both islands and helped to identify a desirable network of in-transit effluent dump sites across both islands. The identification of a desirable network was based on a set of parameters relating to the:

- Proportion of stock that are stood for at least 4 hours prior to transportation (75%)
- Size of effluent holding tanks on trucks (300 litres)
- Premise that effluent dumping facilities are available at every stock destination site
- Identification of stock destinations with an assessment of future rationalisation trends within the industry.

Regional studies have been carried out in principal dairy farming areas that focus on specific local requirements in more detail, these studies include:

TRC (Sept 2001) Regional Stock Truck Effluent Disposal Strategy for Taranaki
www.trc.govt.nz/assets/taranaki/publications/strategies/pdf/effluent-strategy.pdf

WRC (2010) Regional Stock Truck Effluent Strategy for the Waikato Region
www.waikatoregion.govt.nz/PageFiles/18147/Regional%20Stock%20Truck%20Effluent%20Strategy.pdf

The Waikato Strategy came about because of the recognition that the region was falling behind in its response to stock truck effluent disposal. Other regions had taken a proactive approach and had constructed a network of effluent disposal facilities catering to industry needs. With this realisation the region has re-examined the issue and worked hard to come up with a strategy that will provide a good platform for efforts to reduce stock effluent spillages on its regional roads. It has the vision: **"WORKING TOWARD ZERO DISCHARGE OF STOCK EFFLUENT FROM TRUCKS ONTO WAIKATO ROADS BY 2020".**

REGIONAL STRATEGIES

Most Regional Councils have developed strategies to deal with stock effluent. If you are considering a facility please make contact with your Regional or District Council to discuss your proposal. This will ensure you have the most up to date information.

4 Funding a Stock Effluent Facility

4.1 Funding Assistance Opportunities

Installing a Stock Truck Effluent Disposal Facility (STEDF) provides many benefits to both Regional Councils (RC) and Local Authorities (LA). The road networks are better protected from effluent spills and the receiving environment, including waterways, are spared from random and sometimes regular spillage events. With these and other benefits in mind there are several possible funding options available that provide financial assistance for the design and installation of collection facilities.

In November 2000 the then Transfund NZ now NZTA adopted a policy to fund the design and construction of stock truck effluent disposal sites around the country. Since then many facilities have been constructed using this available funding source with LA and RC contributing depending on the location and circumstance.

NZTA's general principle is that the original owner of the transported stock benefits from the sale of that stock and should therefore pay for the funding and provision of stock effluent disposal sites. As there is no cost effective method of levying stock owners to pay for the construction and maintenance of collection facilities, local rates paid to either a LA or RC are considered a fair method of raising a proportion of the overall costs associated with the facility. NZTA's funding component is recognition that road users are willing to pay for the prevention of effluent spillage on our roads.

CASE STUDY 1

Early in 2012, Waikato Regional Council voted to rate all properties in the region to contribute towards the construction and maintenance of STEDF's (50% from WRC and 50% from NZTA). The rate-take equating to approximately $4 per rural property and $2 per urban property.

Each of the sixteen NZTA (state highways) sub-regions is required to produce and submit to national office its own prioritised 'Regional Ten Year Plan'. In order for a project to be included in this plan the Council promoting the stock effluent facility must notify the Regional NZTA office of its intentions to develop a facility and reach agreement for sharing the associated costs. Should NZTA support the proposal, an application can then be prepared and submitted for the investigation, design and construction phases of the proposal. How the local share is determined is up to each individual Council. The Council could, by agreement, approach other Councils where shared benefits are identified and promote a shared cost framework. In some cases the relevant RC has contributed to the local share.

Note: The above funding policies are often reviewed so it is recommended that you contact your local NZTA office for the latest advice.

4.2 Funding Reference Manuals

In August 2008 the 'Planning, Programming and Funding Manual' was released by NZTA. This manual was to guide the 2009/10 – 2011/12 Regional Land Transport Programmes (RLTP's) and the National Land Transport Programme (NLTP) – the first three year transport programme. Reference was made to design and construction funding for Stock-truck effluent facilities in chapter F 10.7.

www.nzta.govt.nz/resources/planning-programme-funding-manual/

Since then in August 2011 NZTA announced they were progressively replacing this manual with a new manual the 'Planning and Investment knowledge base' (PIKB) that sets out the planning, operational policy and processes for developing the NLTP, to give effect to the Government Policy Statement (GPS). With reference to this new manual the key funding points are detailed in the section titled Stock effluent facilities. Refer to following sections 4.3-4.5 for a summary of the requirements.

www.pikb.co.nz/home/ao-local-transport-programmes-process/5-draft-update-transport-programme-and-input-to-tio/new-and-improved-roads/stock-effluent-facilities/?Search=effluent

4.3 Funding for Investigation and Design

Assuming the facility is to be built on or near a State Highway, NZTA will generally provide funding for the investigation and design. When funding is approved and construction proceeds, construction surveillance will also usually be funded.

4.4 Funding for Construction

Construction costs can generally range from $200,000 to $400,000 depending on:

- The collection method (tank/pond/sewer)
- The means of effluent treatment
- What road or access improvements are identified
- Whether land purchase is required.

NZTA provides funding assistance for construction via the Funding Assistance Rate (FAR).

When a land transport activity undertaken by a council or other approved organisation qualifies for funding from the National Land Transport Fund (NLTF) the FAR determines the proportion of the approved costs of that activity that will be paid from the Fund.

The current FAR for STEDF's is based on the following:

- 50% of the cost of the construction or renewal of the stock effluent facility, plus
- 100% of any necessary road improvement works to enable vehicles to enter and exit the facility safely, regardless of location i.e. alongside a local road or a state highway.

Eligibility for funding is outlined under:

Work category 321: Traffic management for construction of a facility

www.pikb.co.nz/home/ao-local-transport-programmes-process/5-draft-update-transport-programme-and-input-to-tio/new-and-improved-roads/work-category-321-new-traffic-management-facilities/?Search=effluent

Work category 221: Environmental renewals for renewal of a facility

www.pikb.co.nz/home/ao-local-transport-programmes-process/5-draft-update-transport-programme-and-input-to-tio/road-operations-maintenance-and-renewal-programmes/work-category-221-environmental-renewals/?Search=effluent

Eligibility for funding is subject to:

- The facility being part of an agreed regional or national strategy
- The relevant Approved Organisation agreeing to maintain the facility and dispose of the effluent
- The facility being situated as close as practicable to the main road or state highway.
- A formal lease or an agreement to occupy is in place, where the facility is not part of the road reserve (therefore providing access to the facility as though it were a road).

4.5 Funding for Operation & Maintenance

Maintenance of stock effluent disposal facilities (including disposal of stock effluent from the facility) is eligible for funding assistance under Work category 121: environmental maintenance. This provides for the routine care and attention of the road corridor to maintain safety, aesthetic and environmental standards.

www.pikb.co.nz/home/ao-local-transport-programmes-process/5-draft-update-transport-programme-and-input-to-tio/road-operations-maintenance-and-renewal-programmes/work-category-121-environmental-maintenance/?Search=effluent

The FAR for approved organisations to carry out maintenance and effluent removal activities is based on PIKB 2012-15 Table 4 – FAR's for certain circumstances. The current (2012-15) FAR for these activities is set regionally, it varies throughout the country.

Legislation & Regulations

The sensitivity and significance of the receiving environment and the resulting environmental effects are important considerations in the site selection process outlined in Section 6 of this guide. The section below sets out the requirements of the Resource Management Act 1991 and the resource consenting responsibilities of Regional and District Councils under the Act. The implications of the Building Act are also outlined, along with approvals required from the relevant Road Controlling Authority.

Figure 1: Checking Consent Compliance, Glengarry Hill STEDF

5.1 Resource Management Act 1991

The Resource Management Act 1991 ('the RMA') is New Zealand's main environmental legislation that controls how we use and manage our environment. The purpose of the RMA is "to promote the sustainable management of natural and physical resources". It follows a core principle of managing the use, development, and protection of resources while avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The RMA contains various duties and restrictions in relation to both the use of land and water, and to the discharge of contaminants into the environment. Where such activities occur, they may only take place if they are provided for in a Regional or District Plan, or authorised by resource consent. Regional councils prepare regional plans that focus on the management of our air, water, land and soil. City or district councils prepare district plans that focus on managing effects of activities on land and the surface water.

Regional and District Plan provisions determine the degree to which various activities are controlled, and these vary from district to district and from region to region. If the activity you want to carry out is not clearly identified as either a permitted or prohibited activity in the relevant District or Regional Plan, then a resource consent must be obtained.

It is recommended that advice is sought from planning officers at both the Territorial Authority and Regional Council as part of the site selection process to get a clear idea of the types of resource consents required and any issues that might be faced through the consenting process. Depending on the complexity of the proposal, specialist planning advice from a resource management consultant may be required as part of the site selection process.

5.2 Regional Council Requirements

5.2.1 Discharge Consents, Land Disturbance and Water Permits

Each Regional Council has to produce a Regional Plan. Most Regional Plans contain rules around discharges of contaminants to land or water. The design of the stock effluent disposal facility and the location of the site will determine which resource consents are required from the Regional Council. The type of resource consents that may be required by a regional plan could include:

- Discharge of treated effluent to land or water
- Permit for the take of surface or ground water if a fresh water supply is needed
- Discharge of contaminants to air (odour)
- Land disturbance for the control of sediment discharge during construction.

Generally speaking, if the stock effluent facility includes a treatment and discharge based system, then resource consent is likely to be needed.

Resource consent may also be required for the discharge of contaminants to air. This primarily concerns the discharge of odour, and is dependent on the rules of the relevant Regional Plan. The location of the site, proximity of adjacent properties, the design of the facility and wind direction are likely to be relevant factors in the determination as to whether consent will be required.

Other regional consents may be required depending on particular aspects of the stock effluent facility's design. This may include consent to:

- Take water from a nearby stream or groundwater bore
- Discharge effluent sludge to land
- To undertake earthworks.

These activities will also be outlined in the relevant Regional Plan as to activity status and resource consent requirements.

5.3 Territorial Authority (City or District Council) Requirements

5.3.1 Land Use Consent

Each District/City Council is required to produce a District Plan, and it is through these Plans that the land use component of the activity is controlled – often through zoning mechanisms which

generally indicate where certain activities or levels of effects are provided for. The zone rules will outline the activities that are permitted within that zone, and which activities will require a land use consent. The types of activities that may trigger the requirement for land use consent from the Territorial Authority include:

- The establishment and operation of the facility
- Earthworks in terms of site stability; natural hazards; and sediment control during construction
- Vegetation removal
- Noise.

5.3.2 Designations

A designation is a provision in a district plan which provides notice to the community that a requiring authority intends to use land in the future for a particular work or project. Most roads, whether they are local council roads or state highways, are designated. This enables the authority that controls the road to undertake road and state highway works within the designation boundary as if it were a permitted activity in the District Plan.

Designations are listed in the relevant District Plan, are assigned a designation number and have a defined Designated Purpose.

The construction of a stock effluent facility within road reserve generally fits within the usual designated purpose of 'Road/State Highway purposes' as it involves stock transport vehicles using the road network with a facility to safely dispose of stock effluent, which in turn benefits other road users. The particulars of the proposal should be discussed with a planning officer at the territorial authority to confirm whether the facility falls within the purpose of the designation given that the specifics of designations can vary.

The advantage of constructing a stock effluent facility on land designated for road purposes is that it avoids the need to apply for land use consent from the District/City Council. If the stock effluent facility is being constructed within designated land, and the District/City Council confirms that the works are within the purpose of the designation; then an *Outline Plan of Works* needs to be prepared and submitted to the relevant District Council (Section 176A of the RMA). This Outline Plan needs to include basic information such as:

- The height, shape, and bulk of the work
- The location on the site of work
- The likely finished contour of the site
- The vehicular access and circulation
- The landscaping proposed
- Any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

If a stock effluent facility will not be within designated land, or the District or City Council considers that the proposal does not fall within the purpose of the designation, then land use consent may be required. Alternatively, the road controlling authority (requiring authority) may require additional private land for road purposes.

It is important to note that designations do not avoid the requirement to obtain any relevant resource consents under a Regional Plan, such as for the discharge of treated effluent.

5.4 Resource Consent Requirements

If resource consent is required it is often a good idea to obtain specialist planning advice. The council planning officers should generally be consulted as a starting point but it may be necessary to obtain specialist planning advice to prepare an Assessment of Environmental Effects (AEE). All applications for resource consent must be accompanied by an AEE. Generally the more complex the proposal or the more sensitive the site, the more extensive the AEE requirements will be, and the more the application will benefit from professional advice.

The council may ask the applicant to seek the written approval of those parties that may be affected by the facility. Applicants are not obliged to seek their approval, but it is likely to make the processing of an application more straightforward. Affected parties could include adjoining neighbours but the extent to which a person may be affected will depend on the particular details of the proposal. If additional land is required for the construction of the facility, the owner of the land will almost certainly be an affected party.

When consulting with potentially affected parties, it is best to be able to discuss any concerns they may have and incorporate ways in which these concerns may be avoided or mitigated. Depending on the nature of the proposal and location of adjoining properties this may include:

- Planting of trees/vegetation to visually improve the appearance of the facility or to screen the facility from views
- The preparation, of a facility management plan so that adjacent landowners are aware of the sites operation and monitoring and have a contact person in the event of complaints
- Fencing of the effluent treatment ponds
- Water discharge monitoring
- Replacement planting where native vegetation has been removed.

If the parties are happy with the proposed stock effluent facility, then having them sign an Affected Persons Consent form and the relevant design drawings is advantageous. This will avoid the need for the relevant council to notify the application, reducing the likelihood of needing a formal hearing to determine the application.

If all of the necessary information has been provided, within the resource consent application and the application doesn't need to be notified, the council should make a decision on the application within 20 working days.

Depending on the chosen site, consultation with tangata whenua may be necessary to determine the cultural values associated with the discharge location as part of the AEE. Tangata whenua claim genealogical links and blood ties to taonga of the natural world, particularly that which relates to the mauri of water. The direct discharge of farm dairy effluent to water is typically unacceptable to iwi.

5.5 Building Act

Building consents are not usually required for the construction of a stock effluent facility, however there may be some circumstances when consent is needed. Examples include:

- Structures associated with the facility such as retaining walls
- Piped drainage reticulation
- Storage tanks greater than 35,000 litres.

It is therefore important for the designer to have some understanding or input from professionals with knowledge of the requirements of the Building Act (BA). The requirements of the Building Code need to be met whether a building consent is required or not.

Refer IPENZ Practice Note 21 (Farm Dairy Effluent Pond Design and Construction) Section 3.3.

http://www.ipenz.org.nz/ipenz/forms/pdfs/PN21_Dairy_Farm_Effluent_Pond_Design.pdf

TOOL BOX – SUMMARY OF LIKELY CONSENTS REQUIRED

- *Resource Consent to discharge contaminants (to land, water and/or air) from the relevant Regional Council*
- *Land use consent to construct and operate a facility from the relevant District Council – unless the site is on road reserve that is Designated accordingly, in which case an Outline Plan of Works may need to be prepared and submitted to the District Council.*
- *Road Controlling Authority approvals*
- *Building Consents.*

5.6 Health and Safety in Employment Act 1992 (HSE Act)

'The object of the Health and Safety in Employment Act 1992 is to promote the prevention of harm to all people at work, and others in, or in the vicinity of, places of work.

The Act applies to all New Zealand workplaces and places duties on employers, the self-employed, employees, principals and others who are in a position to manage or control hazards'. HSE Act[4]

[4] *Health and Safety in Employment Act 1992 (HSE)*

5.6.1 Road and Site Safety

Safety of staff on the road during the course of work aspect is an activity that can be overlooked. To ensure the safety of all workers (either stock truck drivers or employees engaged with maintenance activities on the site) measures need to be taken to provide a safe working environment. This may include effective written policies for the management of work-related road and site safety. Employers also need to ensure that employees are aware of their roles and responsibilities.

Examples may include:

- In-Transit stock truck effluent disposal facilities are usually situated on or near major transport routes. They require the truck driver to exit the flow of traffic in order to use the facility and afterwards to enter a live stream of traffic to resume their journey. Owners of the site must ensure that it is designed to minimise the potential risk to the truck driver and passing motorists
- Destination sites are often at sale yards or meat works where drivers enter private property to carry out the effluent disposal as part of their delivery or pickup of livestock. In this situation the driver must be aware of site-specific hazards including: other site traffic, loading ramps and pits and pedestrian foot traffic etc.

There are a number of practices that can be applied both during construction and during operational or maintenance activities in order to mitigate these safety hazards. Some examples are listed below:

- Meet visibility standards for traffic entering and exiting the facility
- Ensure adequate warning signage along with clear road markings for traffic approaching or vehicles passing the facility
- Identify appropriate signage
- Provide operation manuals that outline HSE Act requirements along with identification of known hazards
- Provide direct communication with operational staff whether they are employees, contractors or subcontractors so that a mutual understanding of each other's health and safety requirements takes place
- Be aware of local authority rules and regulations and how they relate to the HSE Act.

5.6.2 Effluent Storage

Stock effluent containment facilities, ponds and tanks can present multiple hazards to an employee or member of the public. These can include:

- Effluent pond systems may present a water safety hazard. They could also leak or fail, causing release of effluent and resulting in potential harm to people and the environment
- Tank containment facilities can contain gases and biological threats which may cause harm to those entering tanks for maintenance.

The owner of the facility is responsible for protecting people from these potential hazards. The HSE Act gives the Department of Labour a range of powers to respond to improperly managed hazards.

- In order to mitigate these threats there are a number of initiatives that can be applied both during construction and under operational or maintenance activities. Some examples are listed below:
- Ensure adequate bunding, fencing and signage around pond facilities
- Ensure tank containment facilities have lockable/tamper proof access lids
- Provide operation manuals that outline HSE Act requirements and communicate directly with operational staff in regard to known hazards and controls.

Refer IPENZ Practice Note 21 (Farm Dairy Effluent Pond Design and Construction) Section 3.5

http://www.ipenz.org.nz/ipenz/forms/pdfs/PN21_Dairy_Farm_Effluent_Pond_Design.pdf

Figure 2: Pond Water Testing (Glengarry Hill STEDF)

6 Site Selection

It is generally acknowledged that the public perception of effluent is that it smells and is unpleasant. Consideration should be given when selecting a site to reduce the perception by:

- Educational talks and information packs
- Visits to existing well run facilities and talking to maintenance staff
- Speaking to neighbouring property owners.

Broadly speaking, a process to find a site should firstly be considered at a strategic regional level where a vision can be created to either eliminate or at least minimise discharges of stock effluent onto the region's roads. A number of regions have developed strategies including Waikato, Taranaki, Otago and Southland that inform and promote the need for facilities within the region and where potentially these should be placed, considering key transportation routes and junction points.

Following on from the strategic regional overview, the more detailed investigation looking into the feasibility of individual sites can begin. Developing a range of options within a radius of interest can focus on potential treatment options along with pros and cons presented in a matrix format to find the optimal site. This process will help mitigate potential construction and operational issues, and minimise public complaints further down the track that may delay or even halt a project.

6.1 Regional or Macro Criteria

In order to obtain appropriate funding a facility needs to gain regional acceptance with consideration given to:

- Ease of operation and maximum availability
- Easy access and proximity to main transport routes
- Reducing delays
- Optimal route length and journey time placement from other collection facilities by catching truck effluent collection tanks before they reach known or potential spillage points
- Geographical placement especially in hilly or mountainous terrain
- Land use and property values (i.e. target rural productive/industrial rather than lifestyle block/urban fringe)
- Investigate the possibility of integration into co-purpose facilities such as fuel stops or truck parks.

6.2 Local or Detailed Criteria

Once the effluent is collected, it is usually transported to the treatment plant by either a pipeline or by cartage in a tanker truck. In some circumstances it may be treated on site by oxidation ponds or irrigated to adjacent farmland. The following criteria should be considered in order to fully assess the viability of a collection facility, and the journey the effluent takes from collection to final disposal after treatment:

- The visible nature of such a facility (loss of views or visual amenity)
- Potential for offensive odour (especially in summer or when the wind is blowing)
- Noise effects on neighbouring properties (when unloading effluent, or maintaining the facility)
- Waterway/groundwater levels, drainage and potential pollution
- Public health concerns related to infection
- Cultural values (iwi and the local community)
- Traffic safety (considering increased heavy traffic movements)
- Available space to build a facility and land ownership (for either tank or pond based structures)
- Effects on flora and fauna (vegetation, terrestrial habitats and stream habitats)
- Effect on farming and horticultural activities
- Site gradient
- Availability of power utilities and telecommunications
- Land suitability and stability for treatment pond construction
- Availability of pond construction materials.

It is vital that careful planning and investigation takes place early in the design process. Consultation with affected parties should take place at the early concept stages and community involvement or buy-in is often important. Often, well-presented proposals can be enhanced by public and community involvement, especially when being promoted as finding a solution to a community issue.

6

In order to have minimal impact on highway traffic including safety and journey time, the design for movements in and out of the facility needs to consider:

- Provision of deceleration and acceleration lanes, and where necessary right turn bays for safe entry and exit from the through road
- Adequate signage and road marking
- Check and maintain sight distance criteria
- Appropriate separation from adjacent property access points, side roads and highway traffic lanes
- Where possible locate the facility within the road reserve
- Distance from main road not more than 200-300m
- Useable both directions, if not achievable restricting movements or a dual facility should be considered.

Design Considerations

Once the need for a stock truck effluent disposal facility has been established a site should be selected that will cater not only for the provision of safe access on and off the highway, but must also allow for the effluent treatment and/or disposal type.

Where an in-transit site is to be located on a state highway, NZTA (after consultation with stakeholders including local authorities) will usually procure consultancy services to design the facility, however other arrangements for design are possible. Where a destination site is to be part-funded as an in-transit site, the owner of the site is likely to be responsible for the design and would work with the local authority and NZTA on the detail that would be necessary for funding assistance.

The designer should keep in mind several criteria (listed below) that must be considered for the truck reception area in order for it to be user friendly and easily maintained. Once the design is completed a safety audit will normally be requested by the owner and undertaken by an independent provider.

7.1 Separation of Waste Streams

It will be important to engage meaningfully with tangata whenua early in the design process in order to align ideals on the collection and disposal of effluent. This will provide guidance in the early stages of planning and design for a facility and clarify the treatment options available. (For example iwi do not look kindly on the mixing of human generated waste and stock effluent for onsite treatment thereby making it essential that camper van waste is not dumped at certain types of stock effluent facility such as pond-based systems or land-based disposal.)

For cultural reasons, there needs to be a clear distinction between the types of effluent collected: whether it is human waste (from campervans) or stock effluent (from stock effluent trucks). Therefore any proposal to combine stock effluent collection with campervan waste needs to clearly demarcate respective facilities.

7.2 Site Access

Because every effluent collection facility is slightly different in nature, access needs to be assessed accordingly. If the site is accessed from either a state highway or local road, visibility and sight distance that conform to NZTA's requirements are critical to the design process. Refer to Austroads Manuals related to geometric design and Intersections.

If the highway adjacent to the facility has good visibility, has straight approaches and is flat in nature, the receptor (either single or double grill) could be provided on one side of the highway for use by both directions of traffic. Key features would include:

- Right turn bay or shoulder widening with a physical traffic island
- Grass strip or additional sealed shoulder separating the through traffic with the site traffic.

7

CASE STUDY 2

The Murchison STEDF is located 2km east of the township on State Highway 6 (South Island). Due to adequate visibility and easy road access the facility is located on the north bound side of the road and used in both directions. Of note is the traffic island, and wide sealed shoulders on the state highway. The effluent is collected via dual grills and is stored prior to collection in a concrete tank.

Figure 3: Murchison SH6 STEDF

Provision of right turn bays, deceleration tapers and shoulder widening should be provided into the reception area from the highway in accordance with the NZTA Manual of traffic signs and markings (MOTSAM) – Part 2: markings and the relevant Austroads Manuals related to geometric design and Intersections.

If providing adequate visibility proves difficult and the provision of a right turn bay impractical, receptors on both sides of the state highway may be an option. This would ensure that trucks do not need to cross the centreline and would improve the overall safety of the site.

Options for effluent collection for a facility with receptors on both sides of the road could include:

- Collection from both sides and piped to one holding tank
- Separate holding tanks
- Separate pond based treatment systems
- A joint sewerage piped system.

Most options will be dependent on the land available, site levels and access to utilities including sewer and power.

CASE STUDY 3

The Glengarry STEDF is located on State Highway 5, 30km northwest of Napier. Due to its remoteness, mountainous terrain, availability of land and sandwiching between two passing lanes it was decided to build a pond based facility on each side of the road as shown in the aerial photo below. Challenges included restraints on vertical and horizontal geometry, safety audit requirements, funding and consent requirements.

Figure 4: Glengarry Hill SH5 STEDF

7

7.4 Signage & Road Marking

The facility will require adequate signage on both the highway approaches to warn drivers that the facility is ahead, and on-site to provide guidance about usage.

Highway signage should be developed with reference to the NZTA Manual of traffic signs and markings (MOTSAM) – Part 1: traffic signs. This stipulates the following minimum signage be placed on the approach to the facility or turn off to the site:

- IG-18 Stock Effluent Disposal (Advisory left/right with distance) – to be located approx. 300m in advance of a stock effluent dump site
- IG-19 Stock Effluent Disposal (Direction) - to be located at or close to the entry point to the stock effluent dump site.

There will be sites where several roads lead to the site and a number or combination of the above signs may be required. In situations where known spillages or illegal dumping of effluent occurs on the road leading to the site, repeats of the IG-18 sign may be necessary.

Other signage placed close to the receptor can advise on:

- The purpose of the facility
- Illegal dumping of wastes other than effluent, e.g. campervans, waste oil etc
- Emergency contact details in case of blockage or damage to the facility along
- Advice on where the nearest campervan waste disposal facility is located.

Figure 5: Information Sign

Figure 6: Human Waste Sign

Highway road marking should be developed with reference to the NZTA Manual of traffic signs and markings (MOTSAM) – Part 2: markings. This may include provision of tapers, right turn bays, wide shoulder markings and give way lines for perpendicular road entry points. Reference to previous project examples will also provide guidance.

On-site road marking may include edge lines to delineate edges of the seal, particularly in remote locations along with sight rails and edge marker posts.

7.5 Truck Receptor Approach Area

The majority of stock trucks using the facility will be towing trailers that are between 15 and 20 metres in length. It is also common for trucks to travel in tandem with other vehicles from the same company on long haul trips. With this in mind it is important to allow adequate clear space either side of the receptor to allow one truck to wait safely while another truck discharges effluent. The waiting vehicle must be clear of both the highway traffic and operational requirements of the receptor.

If the facility is adjacent to sale yards or meat processing plants an analysis of the possible frequency of use will indicate if additional parking space should be provided. This will depend on stock sale times/days and or delivery times/processing times.

7.6 Manoeuvring and Turning Paths

Because of the size and nature of stock trucks adequate manoeuvring space must be provided leading into and out of the facility. With the aid of on-road tracking paths based on NZTA RTS18 (Aug 2007) New Zealand on-road tracking curves for heavy motor vehicles an assessment can be made of the area of seal required to accommodate the turning movement and provide adequate clearances. In order to minimise future maintenance costs and promote ease of use, turning circles of 30 metres diameter and greater should be used. This will avoid sealed surfaces being un-necessarily scuffed and subject to undue wear and tear.

The turning paths can be assessed by either the use of printed turning circle template information available with RTS18 or through the use of computer based programs like 'AutoTURN', 'AutoTRACK' or 'Sweep'.

The approach to the disposal receptor should be reasonably flat and provide the best possible visibility for the driver. As truck drivers generally use their mirrors to judge the locations of the discharge pipes in relation to the receptor grills, it is important to allow the truck to be as straight as possible moving onto and off the grill and concrete pad. This will enable the driver to judge the best location to stop and discharge the effluent. Employing this design measure will help to minimise unnecessary over spills on the apron. Refer Fig 7 and 8 below.

Another technique is to install numbered measuring lines from the centre of the receptor at 1m intervals for truck stopping guidance, although anecdotal evidence from drivers suggests that this is of little practical use, and that using mirrors and keeping the truck straight is the preferred method.

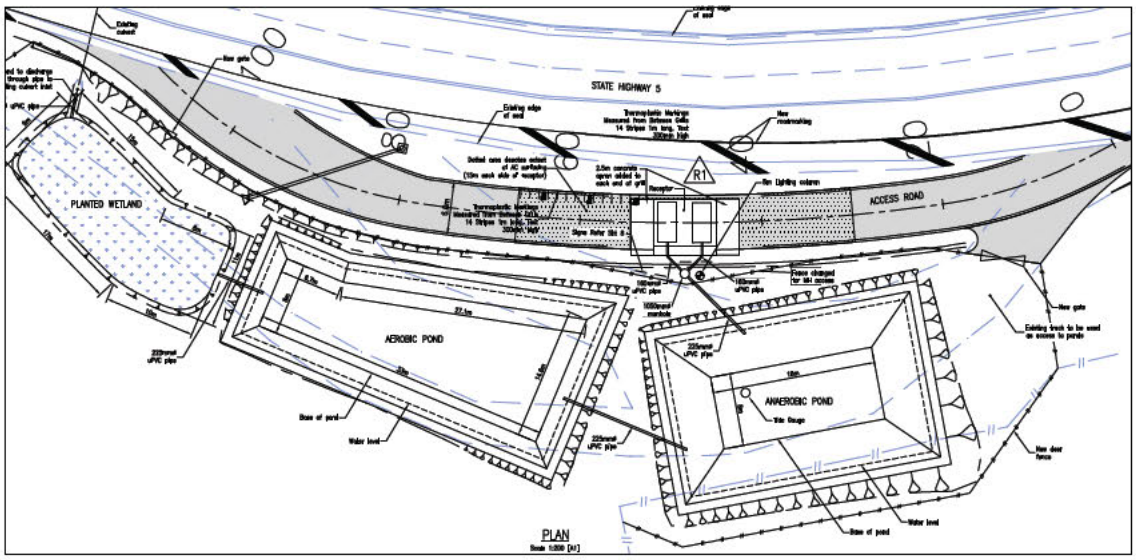

Figure 7: Plan of North Bound Truck Approach and Receptor, Glengarry Facility

Figure 8: North Bound Truck Approach, Glengarry Facility (This is a relatively straight approach to the receptor grills)

7.7 Receptor Design

Over the last 5-10 years, improvements have been made to the standard layout and design of the receptor area. This has been as a result of feedback from operators and truck drivers and provides a more robust solution to minimise pavement and surfacing problems that have plagued older facilities. Changes in truck design over recent years have also resulted in most vehicles having only one rear effluent discharge point on each truck and trailer unit. For ease of use many also have automatic cab controls for the tank discharge valve. This allows for rapid emptying and minimal delays to travel times.

Key features of the new receptor designs include:

- Use of single or double receptors
- Precast or Cast in-situ options
- Wide concrete approach and departure aprons (2 metres minimum from edge of grill)
- Asphalt approaches to the concrete apron (minimum one truck length)
- Concrete edge aprons and kerbed sides (minimising spillage and providing clear delineation)
- Simplified reinforcing details
- Simplified and cost effective grill construction minimising material wastage.

7

The option of providing a single grill receptor rather than a double has several advantages that should be considered when designing a facility. Following consultation with road transport operators and operational observations there is little evidence that two grills are used at the same time by trucks unloading effluent. Truck designs have changed over the last 10 years through most parts of New Zealand and as a result discharge points have been minimised where possible to one outlet per truck or trailer unit. Advantages of a single grill can be:

- Lower construction costs in both steel and concrete, saving around $20,000 per facility
- Lower maintenance costs for cleaning.

Figure 9: Kauri STEDF (Northland) Precast Receptors Being Constructed 2012

Figure 10: Kauri STEDF (Northland) Precast Receptors Finished in Place, Built Late 2012

Figure 11: Glengarry Hill SH5 Cast in-Situ Receptors Being Constructed, 2010

Figure 12: Glengarry Hill SH5 Cast in-Situ Receptors Constructed, 2010

7.8 Tank Based System

Collection systems based on storing the effluent for later pickup can enable facilities to be built with minimal land requirements. These can be located some distance away from local townships or housing settlements. Construction costs are at the lower end of the scale, however the downside is that the running costs are usually fairly high due to the requirement to transport the effluent offsite for subsequent disposal and treatment (which also incurs costs).

The size and type of storage tank will be dependent on:

- Expected daily volumes
- Frequency of emptying
- Retention time, related to possible partial treatment of effluent by anaerobic bacterial action, lowering Biochemical Oxygen Demand (BOD)
- Ground subgrade conditions and level of ground water
- Lid loading expectations (e.g. do the trucks have to drive over it?)
- Consent conditions related to the risk of ground water contamination
- Expected design life.

Considering these issues most tanks end up being specifically designed. Please refer to the examples below.

CASE STUDY 3

The Murchison STEDF is located 2km east of the township on State Highway 6. The storage tank was located beside the receptor with minimal lid loading requirements. The concrete tank has an effective storage volume of 28,600 litres. It includes an internal baffle and is designed to retain the effluent for 10 days (partial treatment) prior to being pumped to an oxidation pond.

Figure 13: Concrete Tank Construction

CASE STUDY 4

The Gisborne STEDF is located adjacent to the Matawhero sale yards and within the 20m road reserve. The storage tank is located under the concrete approach apron to the receptor. The stock trucks drive over the tank to access the receptor. The tank is a 20,000 litre reinforced fibreglass tank (similar to a forecourt petrol storage tank). Due to the overall loading requirements a fibreglass tank was considered the most cost effective solution. A suitable concrete tank would have required a larger excavation, heavy lifting equipment and cost at least twice that of a fibreglass tank.

The effluent is stored for maximum of one week prior to transportation to a dewatering plant and worm farm operation.

Figure 14: Fibreglass Tank

7.9 Sewer Based System

Many STEDF's discharge either: directly into a local municipal sewer scheme or indirectly after partial treatment by anaerobic bacterial action (lowering BOD). The use of a local municipal sewer based disposal system to receive effluent will usually be dependent on the proximity of the local sewer system and how practical a connection is. Disposal into these systems will also be dependent on the sewer treatment process: many TLA's now have WWTP's that have finely tuned biological systems and a load of high BOD effluent may not be compatible.

Sewer based systems can be expensive to construct depending on the connection length and partial treatment requirements. They also are subject to trade waste fees for the disposal of the effluent into the municipal sewerage scheme. Long term, this can prove costly and can attract considerable charges between council departments. Thought needs to be given to the long term financial viability of such facilities in the early planning stages.

Consultation with both local authority water and road engineers early in the design process is essential in understanding what will be acceptable and how it can be achieved.

Comprehensive reference documents include the following:

- NZS 4404 Land Development and Subdivision Infrastructure
- Council (TLA) Engineering Code of Practice
- NZBC Clause G13 Foul Water
- Specific design / research documents owned by Consultants.

7.10 Pond Based System - Reference Documents and Design Accreditation

Pond based systems are usually considered when facilities are located in more remote locations adjacent to State Highways or local roads. They must have adequate land available (2000-3000 square metres) and be located at least 400-500m away from neighbouring residential houses. This will help minimise concerns over odours and night time truck movements. Pond systems generally have higher construction costs but lower running and operational costs.

The specific design requirements of any pond-based treatment system have been well developed. Comprehensive reference documents include:

- IPENZ (Sept 2011) Practice Note 21: Farm Dairy Effluent Pond Design and Construction
- Dairy NZ: (Feb 2010) Farm Dairy Effluent (FDE) Design Code of Practice
- Dairy NZ (Feb 2011) Farm Dairy Effluent (FDE) Design Standards.

These should be referred to when undertaking any stock effluent pond based treatment design. These documents have been developed by professional with considerable experience in the design and operation of stock effluent treatment ponds.

In addition, Irrigation NZ along with Dairy NZ have developed a Farm Dairy Effluent System Design Accreditation Programme for professionals to demonstrate competency in designing stock effluent treatment systems. It is highly recommended that the services of such accredited professionals are engaged to either undertake the design work, or to technically review the design undertaken by another professional designer.

Figure 15: Glengarry Hill STEDF, Pond Construction Early 2010

7.11 Utility Connections

Depending on the type of facility it may be necessary to connect to power, telecommunication, sewerage and water systems. These connections and the distance from the nearest supply point must be considered early in the options selection process, as connection may be expensive and ultimately decide whether the facility is economically viable. The design for these connections must be undertaken by a suitably qualified designer or engineer.

7.12 Lighting

At most receptor locations a minimum of one street light will be required to aid the truck driver in unloading effluent from the tanks during darkness. In remote locations, lighting is essential due to the lack of other lighting sources, and if traffic islands separate the facility from the main highway, lighting is required for road safety reasons as well. Connection to power sources may in some locations prove a challenge both physically and financially and consideration of standalone lighting sources using solar panels and LED lighting could be considered. The price for this type of installation is nowadays similar to conventional power sources.

If you do consider stand-alone lighting sources, consideration needs to be given to the security of the asset in remote locations.

7.13 Remote Telemetry Monitoring

Tank based collection facilities usually require telemetry monitoring to indicate and record water levels. This is carried out through the use of various sensors with the results communicated via telemetry. Uses for the data can include:

- Notification to Contractor/Council of need to empty tank
- Emergency overflow status
- Historic data trends and alarm frequency
- Consent compliance (weekly/monthly/yearly volumes)
- Helps predicted annual running costs.

Telemetry systems are generally designed by specialist companies. It is suggested advice be sought from companies that supply these services to the local council that will run the facility after construction. This may then allow possible integration with other council telemetry monitoring computer systems and allow fast and easy response when required in case of emergency, for example when the effluent tank reaches capacity. This could also link by text or recorded message service directly to the maintenance contractors notifying them of tank effluent levels and advice on when to empty the storage tanks.

CASE STUDY 5

The Murchison STEDF is located 2km east of the township on State Highway 6 (South Island). The storage tank has an effective storage capacity of 28,600 litres and is located beside a double grill receptor. The water level is monitored by Siemens Multiranger/ Echomax level transducer. This device is attached to the roof of the tank and can filter out any disturbance caused by foam or ripples. The tank also has a float switch with flashing alarm light backed up by battery to be able to alert the public if the station is in trouble.

The transducer is connected to a "SCADA" remote monitoring system for a continuous history download and can alert the effluent disposal contractor to when the storage tank needs emptying.

Below is a graph compiled from telemetry site data and screen shots from the SCADA monitoring system.

Of note is the recording of rainfall events that can be used to assess the net volume of effluent by removing potential rainfall flow into the storage tank. This is then used to assess the effects of rainfall on the collection system and associated costs. During 2010/11, it is estimated that 37% of the total volume transported was rainwater.

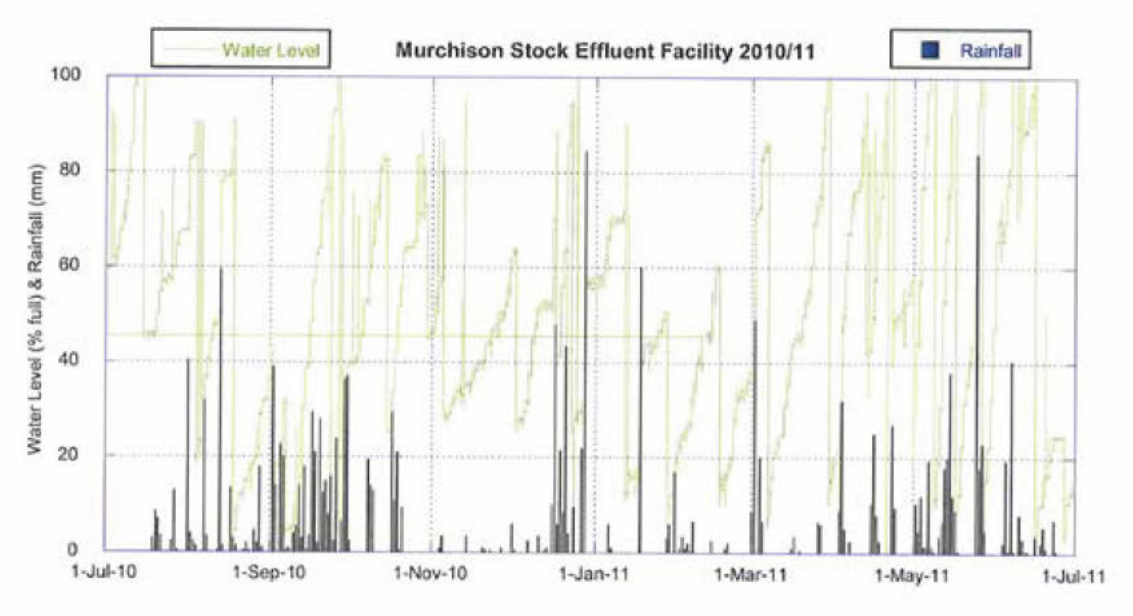

Figure 16: Murchison Telemetry Monitoring System – Graph of Monthly Results

Figure 17: Murchison Telemetry Monitoring System – Graph of Daily Results

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CASE STUDY 6

The Waiotahi STEDF is located in the Eastern Bay of Plenty on SH2. The storage tank has an effective storage capacity of 12,300 litres and is located beside a double grill receptor. The water level is monitored by a 'Waterpilot FMX167 Hydrostatic Level Recorder' that sits on the bottom of the tank and is connected to a "Loncel" remote monitoring and telemetry system. This alerts the effluent disposal contractor (Tankman Ltd) to when the storage tank needs emptying. This facility also has an overflow septic tank with a capacity of 4950 litres installed additional to the main holding tank. This provides plenty of additional capacity in the event of the contractor being delayed in emptying the site.

Below is a screenshot from the telemetry site that can be accessed to download data, an automated text message is sent to the contractor who empties the tank and cleans the site when the tank gets between 75% and 95% full.

Of note is the blip on the Feb 18th when it went over 100%, this was when repairs and calibration of the new level recorder were being carried out by filling the tank with water.

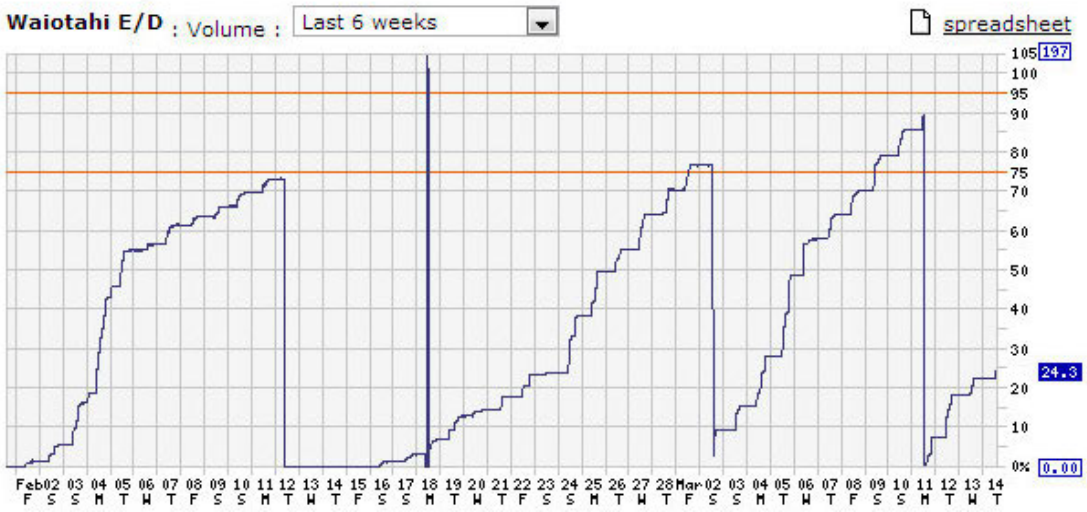

Figure 18: Waiotahi (Opotiki) Telemetry Monitoring System

Effluent Treatment Options

8.1 What Are The Effluent Characteristics?

The characteristics of effluent collected from stock trucks will vary depending on the type of livestock being carried. It is generally accepted that cattle will produce more effluent than sheep, deer and goats, and that the weather and stock standing times are also hugely influential when considering consistency and volumes of effluent produced.

The chemical composition of effluent is often variable but is characterised as having high BOD and suspended solids concentrations. The discharge of a tanker load (say 8,000-10,000 litres) of raw stock effluent may have a disabling effect on smaller conventional municipal sewerage treatment plants, upsetting the biological processes and potentially crippling the plant.

Raw stock effluent contains many different pathogenic bacteria, viruses, protozoa etc. The literature available on the subject would indicate that the appropriate detention time necessary in a two stage anaerobic/ aerobic treatment plant to achieve an acceptable effluent quality would also be sufficient to adequately reduce pathogen population numbers.

Testing carried out on raw effluent by the South Waikato District Council in the early 1990's gave the following results:

PARAMETER	TYPICAL CONCENTRATION RANGE
5 Day Carbonaceous Biochemical Oxygen Demand (CBOD5)	1600 to 7800 g/m3
Total Suspended Solids	7000 to 53,000 g/m3
Faecal Coliforms	1,000,000 to 20,000,000 cfu per 100 ml
Ammonia Nitrogen as N(NH4N)	200 to 1000 g/m3
Total Oxidised Nitrogen (Nitrate + Nitrite) as N	0.3 to 2.0 g/m3
Total Phosphorus	50 to 340 g/m3
pH	7.0 to 8 3
Total Kjeldahl Nitrogen as N	850 to 1600 g/m3

Table 1: Typical Effluent Characteristics (Putaruru Holding Tank)

The figures would apply to typical cattle effluent and could be used in the design of a new treatment system or for assessing the impact on an existing treatment plant.

8.2 What Volume Should Be Expected?

In terms of the design process, effluent volume estimation is not easy and can be subject to a number of influencing factors. Careful consideration of these factors must be undertaken in order to size and design an effective stock effluent treatment or storage system. Factors that will affect the volume collected include:

- Stock standing time, prior to transport
- Time of the year, seasonal stock movement
- Typical weather patterns, rainwater
- Location in relation to main stock transport routes
- Ease of use by stock trucks
- Size of effluent holding tanks on trucks
- Consultation and education within the transport, farming and meat industries.

Consultation with the transport industry clearly indicates that stock standing time is a major contributing factor relating to effluent volumes collected en route. Education within the industry is seen as a key way to minimise volumes and should be considered at the stock pick-up points on farms and sale yard facilities, to ensure standing times are adhered to prior to stock being loaded on the trucks.

Seasonal differences relating to effluent volumes are clearly defined within some parts of the country. In areas such as the Waikato and Southland - two principal dairy farming regions - effluent volumes surge around seasonal and operational events. These include for example: farmers relocating stock for winter grazing, and 'Gypsy Days' where sharemilkers relocate their stock to the next farm of employment. Many transport companies have strategies to cope with these peak movements, however the lack of suitable effluent disposal sites often causes widespread problems resulting in public complaints and council frustration.

Other non-dairy seasonal differences around the country relate to stock lifecycles for beef cattle, sheep and deer, which can involve movement between remote farming operations to either saleyards or meat processing facilities. The economic reality of farming operations and how they interact with livestock agents can result in stock travelling huge distances around both the North and South Islands in order to achieve the best price.

Various attempts to model national or regional stock movements do provide some guidance when designing a facility. The two documents below focus on movements across the south and north islands:

Thull JP (Sept 1999) Management of Stock Effluent Spillage from Trucks in New Zealand (Lincoln University) focusing on the south island

researcharchive.lincoln.ac.nz/dspace/handle/10182/778

OPUS International Consultants (Oct 2003): North Island Stock Truck Effluent Strategy Study Network Modelling Results

www.rcaforum.org.nz/north-island-stock-effluent-modelling-study/

Both studies provided a plan for a broad strategic network of collection sites across New Zealand. The rationale for the site locations was based on: idealised situations with respect to the percentage of stock that have been stood off feed prior to transportation, the size of truck holding tanks, the establishment of the full network of in-transit sites, availability of discharge facilities at all destinations and distance apart.

Experience has found that volumes fluctuate throughout the year due to seasonal operations and commercial demands, with some regions experiencing peak movements in the May - June period when farms are changing hands. All these aspects and any other local knowledge must be taken into account when deciding on the design of the facility.

The studies are still a great source of assessment information. Many of the recommended sites have been progressed, and are either installed or are in various stages of planning and design. Regionally focused models and strategies have been developed since the South and North Island studies. These are focused solutions and take into account the issues mentioned above in more detail.

TOOL BOX – ESTIMATING VOLUMES

- *Types of stock principally being transported and standing times*
- *Number of predicted stock truck movements*
- *Location in relation to journey time and distance between facilities*
- *Volume per truck 200-300 litres*
- *Type of collection: tanks, ponds, sewer (or a combination)*
- *Type of disposal: municipal sewerage facility, oxidation ponds, irrigation, dewatering, worm farm etc.*

Example 1:

A storage tank may be required for up to 10 days storage, before discharge to a municipal sewer scheme in order to semi-process the effluent and lower the BOD to allowable levels. In an anaerobic process, oxygen depletion can potentially create a corrosive environment leading to sewer pipe and process plant damage. This needs to be discussed with council/process engineers.

Example 2:

A pond system may be required to provide storage based on the treatment time needed to effectively lower the effluent BOD, nutrient and pathogen load to an acceptable consented level. This may involve an anaerobic pond, aerobic pond and wetland, each feature providing a key part of the biological process.

8.3 What Are The Available Effluent Treatment Options?

The options available for treatment and disposal of stock effluent can include the following or a combination of:

- Collection and disposal to an existing municipal sewerage treatment plant by sewer pipeline connection by either direct or delayed partial treatment means
- Collection and storage in a holding tank facility for later transportation to an off-site treatment facility
- Discharge to a nearby purpose-built treatment pond system (e.g. 3 pond anaerobic/aerobic/wetland system)
- Discharge to an existing farm/meat processing facility treatment pond system. (refer sections 10 and 11)
- Collection and disposal by irrigation to farmland.

In each option consideration should be given to the removal of large objects, gravel and sand from the effluent stream prior to treatment. This will mitigate pipe blockages and unnecessary wear and tear on the facility and associated infrastructure. This can be achieved by the use of separation grills or screens (say 50mmm spacing) after the receptor to remove bottles, cans etc. and the use of stone traps to remove gravel and sand prior to pumping or sewer conveyance.

The capability of each option to satisfactorily treat stock effluent to a condition suitable for discharge will require detailed biological process design. As new treatment facilities can have a high initial capital cost, it is often more efficient to utilise existing treatment systems where possible. Issues to consider in this situation would include:

- Means of access for stock transport trucks and proximity to main transport routes
- The ability of the treatment facility to accept additional effluent without compromising the final quality of the treated effluent
- Any pre-treatment requirements that may be required. (e.g. influent holding tank to allow controlled dosing into the treatment plant process to avoid overloading)
- Effects on existing resource consents for the facility
- Imposition of treatment charges on the owner of the facility.

8.4 What Are The Disposal Options For Treated Effluent?

The final quality of the treated effluent will be dictated largely by the method of treatment and the consented method of disposal. Options available for disposal could include:

- Discharge to an existing municipal treatment plant. This would generally require continuing compliance with any existing resource consent conditions
- Discharge to land through irrigation to productive or arable land, forestry, etc
- Discharge to land through sub surface infiltration.

Organic solids and sludge produced as a by-product of the treatment process could be dewatered and disposed of to an organic compost or worm farm operation.

With the large number of sites now operative in New Zealand there is a wealth of experience and knowledge available that can be utilised by a designer to assess appropriate solutions for their situation. Contact should be made with the NSEWG to obtain the latest information and developments regionally and nationally. Local Authorities (TLA), Regional Councils and the regional offices of NZTA would also be a useful source of information.

CASE STUDY 7

The Glengarry STEDF is located on State Highway 5 north of Napier. The effluent is collected and treated via a series of anaerobic and aerobic ponds followed by discharge to a planted wetland where infiltration occurs.

Environmental monitoring to date shows an average effluent treatment quality of:

BOD ranging from 30 to 70 g/m3

Total Nitrogen ranging from 60 to 90 g/m3

Total phosphorus ranging from 13 to 18 g/m3

The total volume of effluent collected each week at the facility (including north and south bound receptors) is estimated to be between 25,000 and 40,000 litres depending on the time of year, this information is based on traffic counts undertaken during November 2012 and adjustment for seasonal variations. The following graph shows a week day average of around 20 trucks.

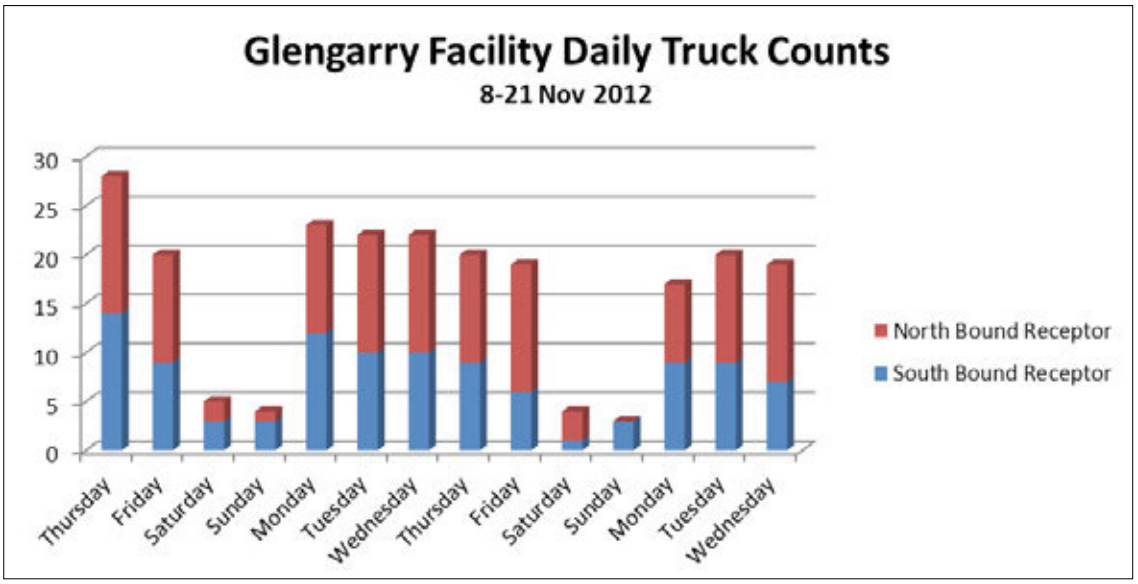

Table 2: Glengarry Hill STEDF Truck Volumes

9 Operation and Maintenance

Once a STEDF has been constructed it is essential that an Asset Owner's Manual (AOM) is prepared and circulated to those involved in the day-to-day running of the site. This manual will seek to outline key objectives necessary for the orderly operation and long term care of the facility along with associated on going and projected capital replacement costs. Broad guidelines for what should be contained in an Asset Owner's Manual is contained within NZTA's Minimum Standard Z/15 – Asset Owner's Manual.

www.nzta.govt.nz/resources/state-highway-professional-services-contract-proforma-manual/standards/docs/Z15.pdf

How this can be adapted to suit the particular needs of a STEDF are outlined in the following section.

9.1 Stock Effluent Treatment and Disposal - Asset Owner's Manual

Utilising the Z15 framework, an AOM tailored for the needs of a stock effluent facility should look to have the following key aspects. The details will vary depending principally on the treatment type i.e. tanks versus ponds or other such treatment type.

9.1.1 Introduction

The introduction should be a brief statement that outlines the reasons for establishing the facility, key objectives, and what collection system and treatment process has been put in place.

9.1.2 Construction/Contractual Phase

This section details the physical works construction associated with the contract to build the facility. It lists the details of the contract, defects liability period, and itemised maintenance activities associated with the construction works.

9.1.3 Operation and Maintenance Activities

This section details the intended usage of the facility along with an outline of the collection and treatment process and associated regular and periodic maintenance requirements. It sets out the responsibilities each party has and outlines the associated activities.

1. Heads of Agreement/Memorandum of Understanding – details the responsibilities and what is required from each party, whether it be NZTA, Local Council or Regional Council
2. Onsite Maintenance Activities – including site inspections, receptor wash down, vegetation control, tank and pond inspections, short/long term maintenance requirements and suggested frequency
3. Emergency Contact Details (including phone and email) – Local Council Road Operations Engineer
4. Resource Consent Compliance and Monitoring - details the consent number, who it was issued by, what was it issued for (land/air/water), lists the expiry date and conditions of consent in relation to on-site activities.

Figure 19: Maintenance Cleaning (Glengarry Hill STEDF)

9.1.4 Health and Safety Overview

This section details the responsibility of the operator to ensure safe working procedures are adopted when carrying out the activities listed above in section 'Operational and Maintenance Activities'. It looks at specific site hazards in relation to the stock effluent facility, the collection and treatment of the effluent, the access on and off the highway and vehicle movements around the site.

9.1.5 Maintenance, Capital and Depreciation Costs

The maintenance costs will vary hugely depending on location, access, method of treatment, use of mechanical or electrical equipment and consent monitoring requirements.

An annual budget plan should be prepared during the preparation of the AOM that takes into account monthly expenditure across all regular maintenance and monitoring activities. Capital replacement and major maintenance activities including work on receptors, tanks, pipework, pumps and ponds will need to be identified in the Local Authorities/Owners 'Long Term Plan' (LTP) with appropriate consideration given to planning the work and necessary budgeting requirements.

9

A stock effluent treatment facility should be accounted for within the Local Authorities/Owners asset register and depreciated over appropriate lifespans. The accounting policies will need to be considered in relation to the different facility components, including: structures, pipework, earth fill, mechanical and electrical equipment. Guidance related to this subject can be obtained from the following:

- New Zealand Asset Management Support (NAMS)
  www.nams.org.nz/
- The International Infrastructure Management Manual (IIMM) 2011
- Infrastructure Asset Valuation and Depreciation Guidelines 2006
  www.nams.org.nz/pages/75/asset-valuation-and-depreciation-guidelines.htm

Figure 20: Pond Water Testing (Glengarry Hill STEDF)

On Farm Effluent Disposal

It is generally acknowledged by the livestock transport industry that disposal of stock truck effluent to 'On Farm' facilities is not a common practice. Many councils and industry leaders including Dairy New Zealand and Federated Farmers have advised extreme caution when accepting effluent from unknown or mixed sources. Risks of effluent-borne disease and damage to the high value of New Zealand dairy exports places many transport companies with few options for effluent disposal other than the transportation of collected effluent back to a central disposal facility. Factsheets advising industry best practice have been produced by local Councils in chiefly in dairy farming areas and by Dairy New Zealand (Southland campaign). These organisations should be contacted for advice on current practices.

If the current advice is adhered to, and the only effluent accepted is from known sources, stock truck effluent disposal on farms may be an option if it is done in an environmentally safe way. The costs associated with this type of discharge vary depending on volumes.

There are farming operations around the country that do have agreements with local trucking firms in particular, to accept and process effluent waste on a commercial basis. In these situations there needs to be careful management to avoid cross contamination to other farming activities.

When considering 'On Farm' disposal of effluent the following need to be considered along with developing an effective management plan that is sustainable and cost effective:

- Operational farm safety (HSE Act)
- Security of supply (where has the effluent come from, is it from the farm's own stock?)
- Disease transfer security
- Food safety requirements (Dairy, Meat)
- Resource consent implications
- Funding appropriate infrastructure
- Capacity of the farm treatment and disposal system (nitrate levels).

10.1 Accepting Effluent On-Farm

The ability of farmers to accept effluent will be largely depend on their individual farming operation, the equipment and facilities available and the adopted farm management practices. Farmers should also consult with their local district and regional council for advice on policy and rules relating to 'on-farm' stock effluent disposal as it may require a resource consent. It is also important to discuss the proposal with your transport operator as they may have company policy and guidelines that could offer assistance on whether to accept the effluent for disposal. An example of this may relate to effluent collected from a single load of stock going to just one farm or whether the dynamics of a split load may cause doubt on the origin of the effluent.

10.1.1 On-Farm Disposal Methods

Examples of 'On-Farm' effluent disposal methods may include the following:

- Emptying effluent into a receiving sump and then irrigating directly to open fields
- Emptying and conveying effluent to existing dairy farm effluent ponds or purpose built ponds through the use of a receptor and pumped pipeline
- Processing effluent through a solids separation unit and disposing of liquid by irrigation to open paddocks. Solids disposal could be to a worm farm activity, bioreactor facility or a commercial compost operation. Reference IPENZ Practice Note 27 Dairy Farm Infrastructure.

Figure 21: Solids Extraction Unit (IPENZ PN27)

10.2 Consent Requirements

As discussed in Section 5 above, resource consent may be required to discharge effluent to land or water. The relevant Regional Plan for the area will set out the activity status for effluent disposal. Generally speaking, effluent will need to go through some form of treatment before it can be discharged to land. The level of effluent treatment required will vary throughout New Zealand and will depend on the specific rules of the relevant Regional Plan.

Regional Plans typically have controls over the application rate of nitrogen, the location of the discharge and the avoidance of run-off to a water course or the infiltration to a water supply bore. The additional nutrients being applied to land from the stock effluent facility need to be factored in to the existing nutrient regime the individual farm may have in place. The Regional Plan may have guidance or regulations on nutrient management, which will need to be incorporated and adhered to.

Meat Processing Industry Effluent Disposal

11

Despite the efforts of regional and local councils, many meat processing operations still lack the infrastructure to collect stock truck effluent. Some operations do provide excellent facilities including truck wash-downs. Feedback from transport firms indicates that the limited number of effluent disposal facilities that have been established are frequently unavailable and closed off for both trucks unloading stock and en-route disposal. Many of the truck wash down facilities available do not have separate 'effluent disposal only' options and as a result drivers have to wait substantial lengths of time in order to dispose of effluent if the wash bays are occupied.

Consideration should be given to the many benefits that providing on site effluent disposal at meat processing plants can bring. These will help increase credibility within key overseas markets and show responsibility when purchasing stock from the farmer.

Well defined regional strategies offer the greatest opportunity to coordinate resources and create synergy between the needs of the transport firms and meat process operators. There are key similarities between 'On Farm' disposal of effluent and meat processing operations that principally relate to concern over the following:

- Operational site safety (HSE Act)
- Security of facility relating to 24 hour access
- Funding to run the facility and ownership
- Trade waste fees
- Consent condition compliance costs
- Disease transfer security, based on market led consumer expectations (Europe/Asia/N America)
- Food safety requirements.

11.1 Disposal Methods

Requirements for disposal of effluent will be similar to those described previously in the 'On-Farm Disposal Methods', although the treatment and the availability of land for disposal is likely to be much more limited.

The disposal methods require a significant level of infrastructure and management and would usually only be considered when regular effluent disposal is required and in conjunction with another similar on-site activity. A single receptor with a standard design could be utilised to collect effluent if a truck wash operation is not involved. Possible treatment and disposal methods include:

- Irrigate directly to available open fields using a sump and pump operation
- Convey effluent by gravity or pump to existing wastewater treatment system. This could include connection to a local municipal sewerage system, oxidation ponds or purpose built wastewater treatment plants
- Process effluent through a solids separation unit and dispose of liquid by irrigation to open paddocks, local municipal sewerage scheme, oxidation ponds or purpose built waste water treatment plant. Solids disposal can be to a worm farm activity, bioreactor facility or compost operation. Reference IPENZ Practice Note 27 Farm Dairy Infrastructure.

11.2 Consent Requirements

If a stock effluent facility is to be located within the site of an existing meat processing facility, then it may be possible to discharge effluent into the processing facility's existing waste water treatment system. Resource consent may be required from the Regional Council for the discharge of trade wastes depending on the design and eventual discharge location.

As discussed in Section 5, the Regional Plan will determine if resource consent is needed for the stock effluent facility. If the design of the stock effluent facility involves the treated effluent being mixed with other treated process water prior to discharge, then this may be covered by the meat processing facilities existing resource consent for trade wastes or discharge. It may mean that any such consent may need to be changed to allow for the additional volumes being discharged, or to cater for the change in process water being discharged.

Figure 22: Gisborne (Matawhero) STEDF, Receptor Construction Sept 2013

12

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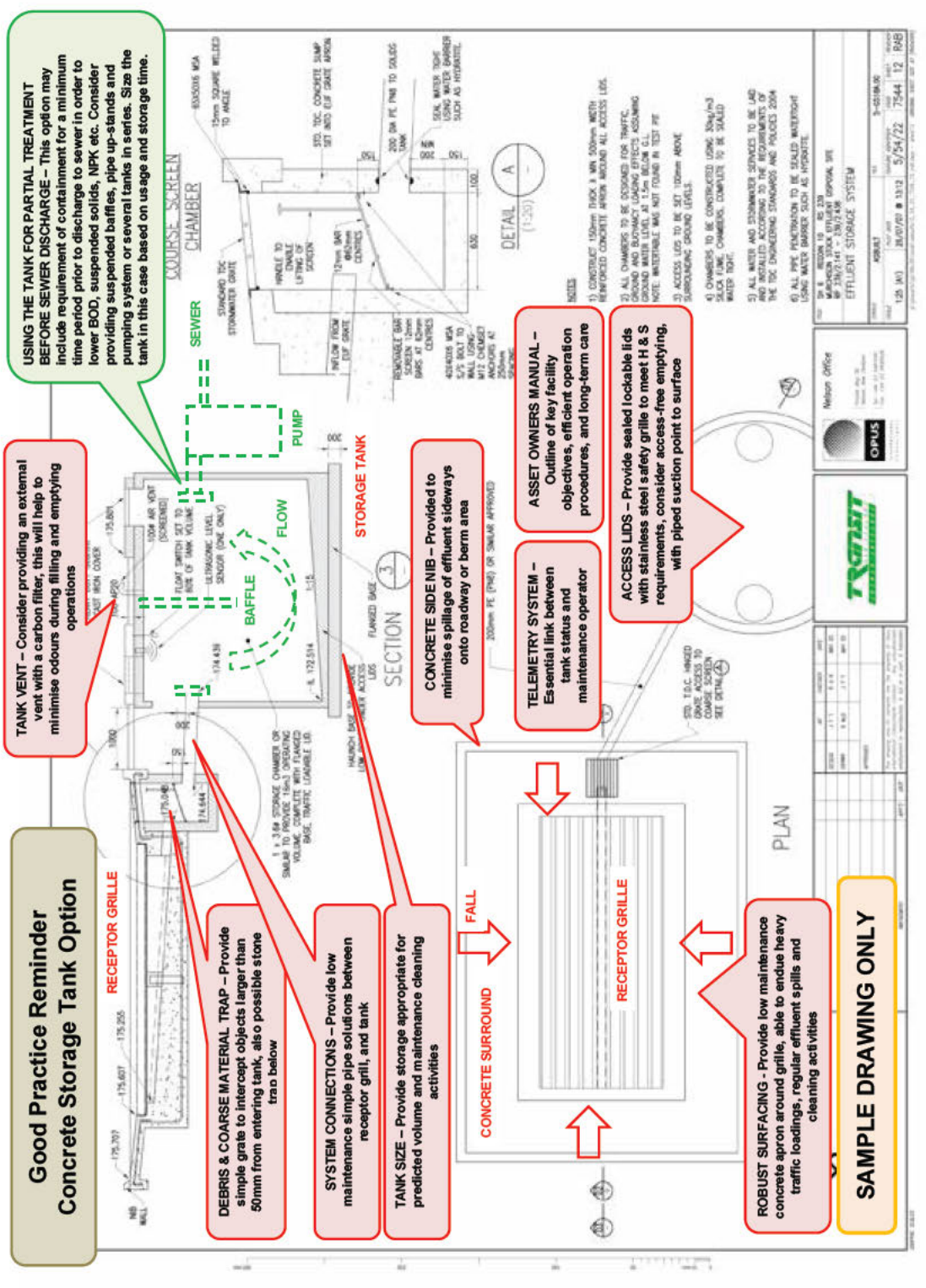
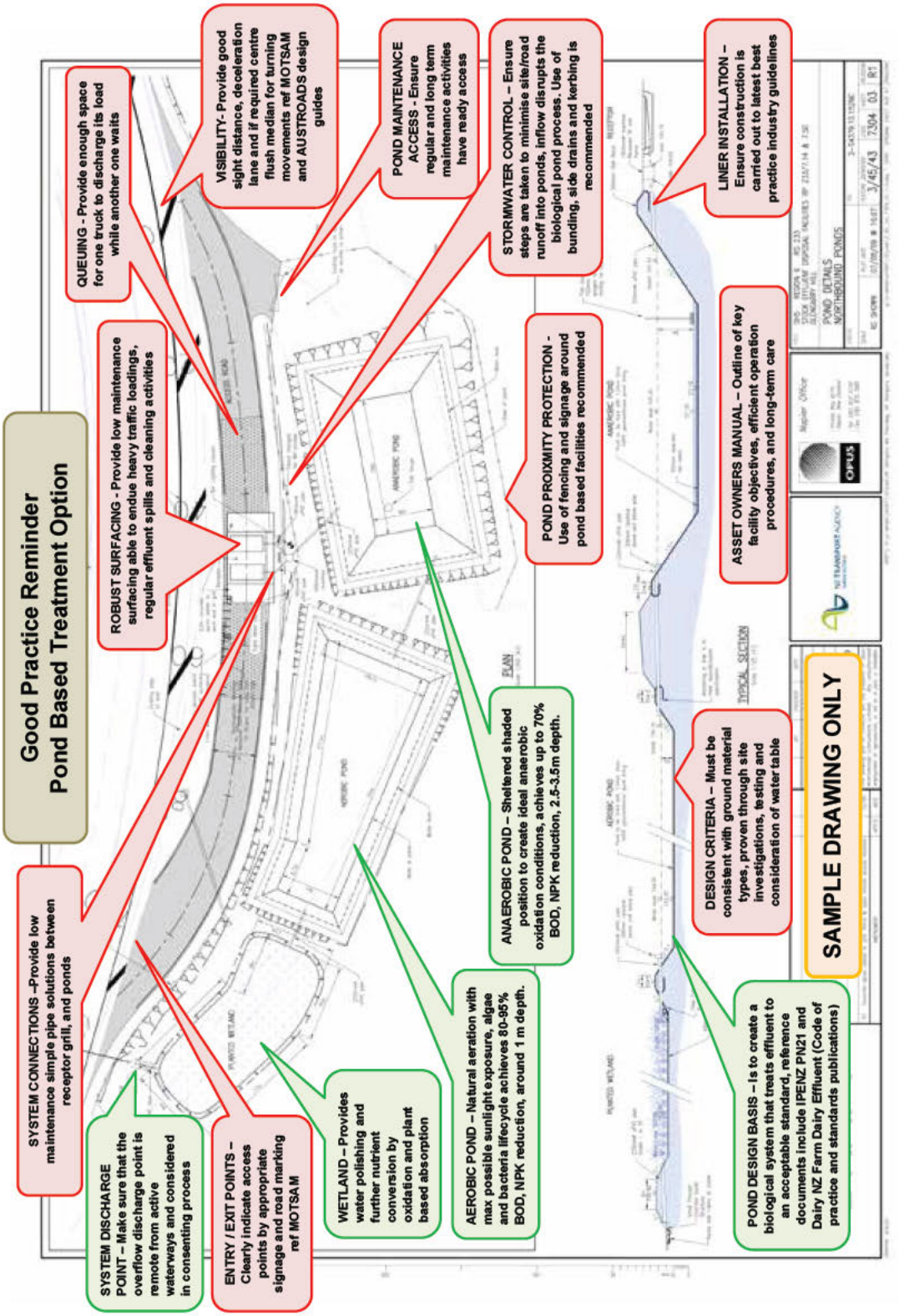
Figure 23: Murchison SH6 STEDF Constructed, 2007

13 Appendices

A Good Practice Reminder – Concrete Storage Tank Option



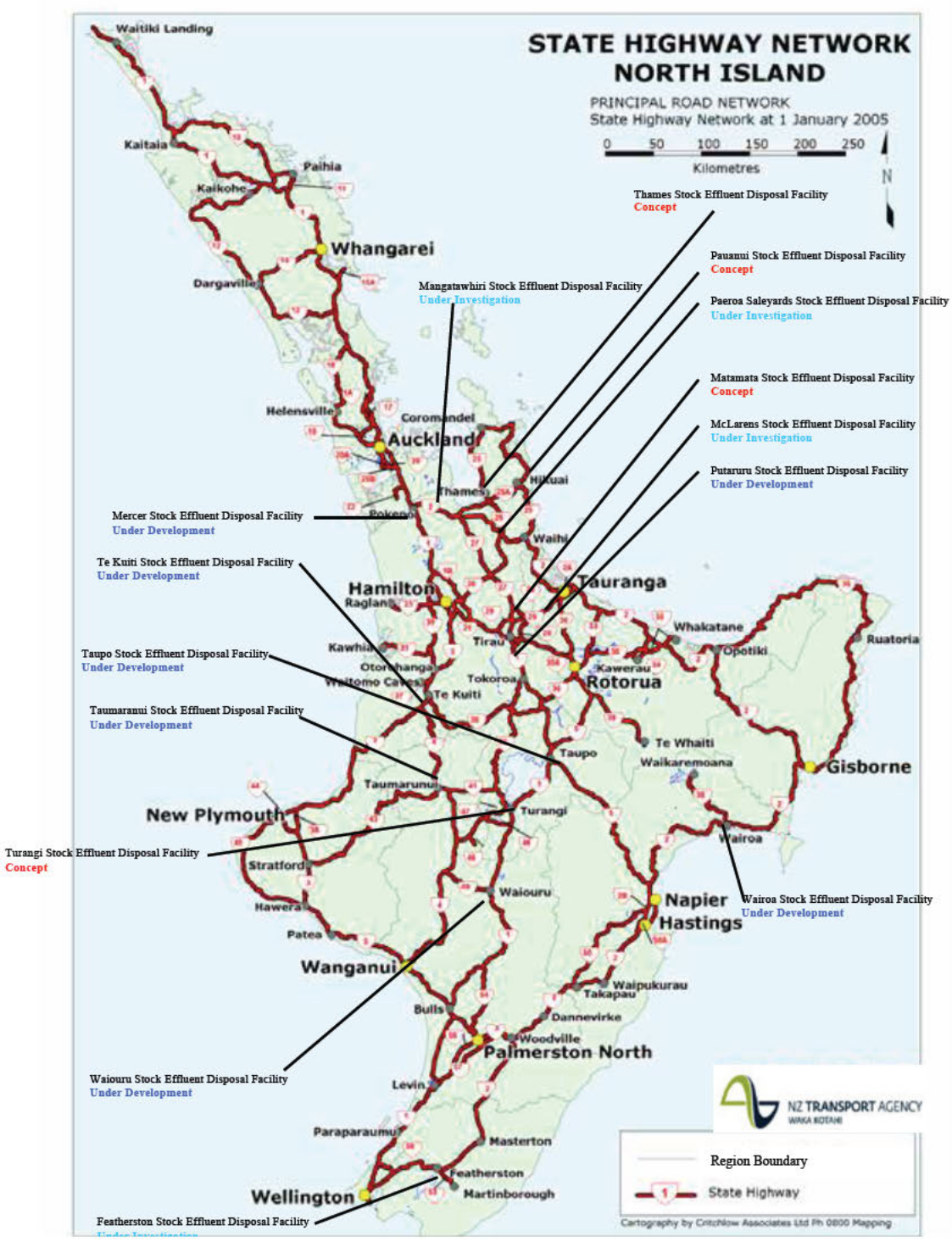
B Good Practice Reminder – Pond Based Treatment Option



C Map of Disposal Facilities – Built Network (as at Oct 2013)


STATE HIGHWAY NETWORK
SOUTH ISLAND
PRINCIPAL ROAD NETWORK
State Highway Network at 1 January 2005
0 50 100 150 200 250
Kilometres
N
NZ TRANSPORT AGENCY
WAKA KOTAHI
Riverlands Stock Effluent Disposal Facility
Built
Murchison Stock Effluent Disposal Facility
Built
Kaikoura Stock Effluent Disposal Facility
Built
Hokitika Stock Effluent Disposal Facility
Built
Glasnevin Stock Effluent Disposal Facility
Built
Springfield Stock Effluent Disposal Facility
Built
Timwald Stock Effluent Disposal Facility
Built
St Andrews Stock Effluent Disposal Facility
Built
Pukeuri Stock Effluent Disposal Facility
Built
Shag River Stock Effluent Disposal Facility
Built
Apes Rd Stock Effluent Disposal Facility
Built
Allanton Stock Effluent Disposal Facility
Built
Allison Rd Stock Effluent Disposal Facility
Built
Raes Junction Stock Effluent Disposal Facility
Built
Blaike Rd Stock Effluent Disposal Facility
Built
Collingwood
Motueka
Nelson
Picton
Blenheim
Mokihinui
Westport
Murchison
Reefton
Lewis Pass
Kaikoura
Hanmer Springs
Greymouth
Hokitika
Arthur's Pass
Rangiora
Christchurch
Akaroa
Ashburton
Franz Josef
Hermitage
Haast Pass
Fairlie
Twizel
Timaru
Omarama
Milford Sound
Wanaka
Waimate
Queenstown
Cromwell
Oamaru
Alexandra
Manapouri
Lumsden
Dunedin
Ohai
Clifden
Gore
Balclutha
Invercargill
Bluff
Region Boundary
State Highway
Cartography by Critchlow Associates Ltd Ph 0800 Mapping

D Map of Disposal Facilities - Planned (as at Oct 2013)




STATE HIGHWAY NETWORK
SOUTH ISLAND
PRINCIPAL ROAD NETWORK
State Highway Network at 1 January 2005
0 50 100 150 200 250
Kilometres
N
NZ TRANSPORT AGENCY
WAKA KOTAHI
Hira Stock Effluent Disposal Facility
Under Discussion
Reefton-Springs Junction Stock Effluent Disposal Facility
Under Discussion
Jacksons Stock Effluent Disposal Facility
Under Development
Mataura Stock Effluent Disposal Facility
Under Investigation
Collingwood
Motueka
Nelson
Picton
Blenheim
Mokihinui
Westport
Murchison
Reefton
Lewis Pass
Kaikoura
Hanmer Springs
Greymouth
Hokitika
Arthur's Pass
Rangiora
Christchurch
Akaroa
Franz Josef
Hermitage
Ashburton
Haast Pass
Fairlie
Twizel
Timaru
Omarama
Milford Sound
Wanaka
Waimate
Queenstown
Cromwell
Oamaru
Alexandra
Manapouri
Lumsden
Dunedin
Ohai
Clifden
Gore
Balclutha
Invercargill
Bluff
Region Boundary
State Highway
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Road Controlling Authorities Forum (NZ) Inc

National Stock Effluent Working Group