



with assistance from
New Zealand Water and Wastes Association
presents

**Managing Stormwater
and Road Run-off
Tools, Techniques and Devices**





MANAGING STORMWATER AND ROAD RUNOFF

What are the issues?

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Two Key Aspects of Road Stormwater

- Quantity
 - Primary objectives are flood management to protect public safety and infrastructure (including bridges)
- Quality
 - Road surfaces collect contaminants
 - When it rains these contaminants are washed off the road surfaces
 - Polluted runoff is degrading water quality in waterways and the marine environment
 - Treatment of road runoff, especially the first flush

Flood Management – Issues to ponder

- There are no absolutes, only predictions
- This uncertainty can be a challenge for the design of infrastructure which has a long life and is expensive to change once built
- Flood protection is about balancing risk and making judgements based on best practice
- Need to balance risks against costs and benefits
- What happens when the rainfall event exceeds the design capacity?
- Responding to climate change is the next challenge

Design Standards

- Trend is towards higher flood protection standards
- Local authorities set standards through District Plans and Codes of Practice
 - Primary systems typically designed for 5 or 10 year events
 - Secondary systems essential for greater events
 - Freeboard to habitable floors of 300-500mm
- Transit has a 1% AEP standard for state highways with 500mm freeboard to pavement level
- Cannot design for every flood event

Why Roothing and Stormwater Engineers need to talk to each other

- Roothing engineers want:
 - The roads to be open for the conveyance of traffic at all times
 - The roads to remain flood free and subgrades not saturated
 - Stormwater engineers to be responsible for getting rid of the runoff and dealing with any quality issues
- Stormwater engineers want:
 - Roads to be available as effective overland flowpaths to divert and channel floodwaters away from private property
 - Roads to be designed lower than adjoining properties so they can provide safe temporary storage areas when systems are overloaded
 - Roothing engineers to address stormwater treatment in the road design





Water Quality – is there a problem?

- Public perception is that runoff from roads is polluting waterways, estuaries and harbours
- Increased community awareness and expectation for cleaner streams and harbours
- Community surveys indicate a willingness to pay to reduce current levels of pollution in stormwater

What Contaminants?

- Heavy metals – Zn, Cu, Pb, Cd
- Hydrocarbons – oil, diesel and grease
- Debris from trucks
- Litter – packaging and cigarette butts
- Animal deposits – stock effluent
- Decaying vegetation
- Silt from temporary roadworks
- Spills from accidents



Why Treat Road Runoff?

- Because runoff can be a major source of pollution
- 15-20% of urban areas are in road reserves
- Road runoff can contribute up to:
 - 50% of suspended solids
 - 16-25% of total hydrocarbons, and
 - 35-75% of heavy metals,
being discharged to receiving waters
- Compliance with Regional Council discharge consent quality standards to protect sensitive receiving environments

Stormwater Pollution and Treatment

- Prevention
- Engineering solutions
- Education and awareness
- Regulation and enforcement

Engineering Solutions

- At Source
 - Catchpit filters
 - Sand filters
 - Low Impact Designs, e.g. rain gardens
 - Swales
- In-Line or End-of-Pipe
 - Ponds & Wetlands
 - Gross Pollutants Traps
 - Various screening, separation and filtration devices

Road Maintenance Practices

- Cleaning
 - Road sweeping frequency
 - Catchpit emptying frequency
- Litter control
- Swale and side drain management
 - Spraying to bare ground reduces ability of swale to intercept and filter contaminants

Education and Awareness

- All road users are potential contributors to pollution
- Politicians – who respond to the community and approve funding
- Programmes which raise awareness in the community with messages such as ‘catchpits are for rainwater only’
- Fire Service – dealing with spills from vehicle accidents
- Roading Engineers

Catchpit Education



Regulation and Enforcement

- Resource Management Act
- Regional Water Plans
- Regional Council discharge consent conditions
- By-Laws?
- Abatement Notices
- Environmental Infringement Notices
- Environment Court Prosecution

Key Questions

- Is there a pollution problem?
- What can we do about it?
- Who pays?