50 SHADES OF GREEN
EQUITY IN THE CHARGING FOR A STORMWATER SERVICE

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ABSTRACT

Since amalgamation, Auckland Council has been working on its hierarchy of planning, engineering and regulatory documents to form a consistent set of rules to help shape the way Auckland grows.

The Proposed Unitary Plan seeks, amongst other things, to better integrate the management of land use and development and associated adverse effects, with a greater focus on the generation and management of stormwater at or near-source.

Auckland Council has also prepared a new Code of Practice for Land Development and Subdivision. The chapter on Stormwater sets out minimum standards for the design and construction of stormwater systems thereby allowing the public component to be vested to Auckland ratepayers for ongoing operation and maintenance, plus eventual replacement.

Auckland Council is also considering a new bylaw for stormwater management. The focus of the bylaw is the requirement of property owners to maintain stormwater devices on private land and the ability of Council to manage activities on private property that have adverse impacts on the public stormwater network

Auckland Council is also moving to a single rating system which will mean all properties of similar value and use will be charged a similar amount of rates.

So with respect to stormwater management we are moving to a more consistent planning, engineering, regulatory and funding approach. However, no distinction has so far been made between properties of similar value and use (i.e. the same level of rates charged) and the different level of adverse effects, resulting from stormwater, that properties have on the ecosystem.

If a user pays model was adopted for the funding of stormwater infrastructure it would be weighted towards those that have the greatest demand on the public network.

This paper outlines a number of stormwater fee structures that are based on impervious area and density of development. These models are considered to be more equitable than the current method of applying a general rate that makes no distinction between properties of similar value that have different demands on the stormwater network and different effects on the environment. Changing regulation has highlighted that there is more than one shade of green when it comes to charging for stormwater services.

KEYWORDS

Stormwater as a service, stormwater fees, intragenerational equity, impervious area, impervious coverage, density of development.

PRESENTER PROFILE

Colin is a widely experienced civil engineer and technical director with over 35 years experience in integrated catchment management having worked on the planning, design and delivery of numerous water, wastewater, stormwater and roading projects in NZ, Australia, Fiji and the UK.

He is currently very busy on a variety of stormwater projects related to the housing boom in Auckland.

1 INTRODUCTION

This paper examines the new stormwater regulations that are being introduced in Auckland through the Unitary Plan and the Stormwater Bylaw and suggests that inequity in charging for stormwater services will increase. The stormwater objectives in the Unitary Plan are to be achieved by regulation alone and will as stated in the Unitary Plan and various supporting documents, take considerable time to achieve. The objectives are widely supported but could be achieved more quickly if regulation is complemented with a stormwater fee structure that recognises the different demands ratepayers have on the stormwater network.

Extracts from the Unitary Plan and the Stormwater Bylaw are outlined below, discussion on the objectives is provided and different stormwater fee structures are suggested.

2 THE PROPOSED AUCKLAND UNITARY PLAN

The Auckland Council has developed the Auckland Unitary Plan (the Unitary Plan) to help shape the way Auckland grows to accommodate the predicted growth of 1 million people over the next 30 years and associated commercial activity. The Unitary Plan (Auckland Council, 2013 (2)) sets out what can be built and where, seeking to create a higher quality and more compact Auckland while providing for rural activities and maintaining the marine environment.

The Unitary Plan will replace the Auckland Regional Policy Statement (ARPS) and the 12 existing district and regional plans (legacy plans), many of which are already more than 10 years old.

Currently these are primary tools for managing land use activities and development and associated stormwater discharges to ensure that adverse effects are appropriately avoided, remedied or mitigated within the legislative framework of the Resource Management Act 1991 (RMA).

It has long been recognised that stormwater runoff is the predominant contributor to water quality and stream structure and health in urban areas. Given the nature and value of Auckland's aquatic environment, stormwater management has been a significant component of the approach to managing fresh and marine waters in the operative ARPS

and regional plans: Auckland Regional Plan: Air, Land and Water (ALW Plan) and Auckland Regional Plan: Coastal (Coastal Plan)).

The Unitary Plan continues to develop and refine this approach to improve environmental and community outcomes and address existing gaps in the stormwater management approach, particularly in respect of integrating and aligning land use and the generation of stormwater and its subsequent discharge. The Unitary Plan provides both the opportunity and the need to review the land use and discharge provisions to develop a consistent approach across the region and therefore includes a suite of provisions that seek to provide a comprehensive approach to land development and stormwater management.

3 SECTION 32 REQUIREMENTS – GENERAL

In accordance with the RMA proposed plans must be examined for their appropriateness in achieving the purpose of the Act (MFE, 2014 (11)). In addition, the benefits and costs, and risks of new policies and rules on the community, the economy and the environment need to be clearly identified and assessed. The assessment is then documented so stakeholders and decision makers can understand the rationale for the policy choices.

Auckland Council prepared an Evaluation Report on all of the matters contained in the proposed plan. Urban stormwater was one of those matters that was subject to a section 32 analysis and parts of the evaluation are noted below.

4 URBAN STORMWATER, SECTION 32 ANALYSIS

4.1 (1.1) SUBJECT MATTER OF THIS SECTION

The Unitary Plan will replace the 12 existing district and regional plans (legacy plans), which contain significantly different provisions and requirements for managing stormwater. The Unitary Plan provides both the opportunity and the need to review current land use and discharge provisions in the legacy plans and develop one consistent approach to stormwater management that integrates regional and district requirements. It also enables further development and refinement of the current approaches to stormwater management throughout the region to reflect best practice, address existing gaps and take account of the increasing knowledge base regarding stormwater management and adverse effects.

The focus of this evaluation (Auckland Council, 2013 (3)) is on the stormwater management approaches that represent a significant change from that of the legacy plans.

4.2 (1.3) SIGNIFICANCE OF THIS SUBJECT

Managing the adverse effects of land use and stormwater on freshwater and coastal waters is a significant issue for the Auckland region as urban runoff is a major factor in the quality and health of these receiving environments. Managing adverse effects requires an approach to future growth that achieves the multiple environmental, social and economic outcomes sought for Auckland to maintain and, where possible, improve the overall quality of the freshwater and coastal environment consistent with national requirements and community expectations. Importantly, this requires an emphasis on both avoiding, as far as possible, the adverse effects of new development and taking

opportunities to progressively reduce existing adverse effects in addition to more traditional mitigation measures.

A comprehensive water sensitive design approach to stormwater management is sought through the Unitary Plan that prevents or minimises the adverse effects of stormwater runoff on communities and the natural environment and restores environments and values where they have been degraded below community expectations or the level necessary to sustain ecosystem health.

The elements of water sensitive design approach include:

Table 1: Elements of Water Sensitive Design Approach

Management Approach		Implementation
Water sensitive design	Avoid developing sensitive areas	Location of new growth areas
	Avoid/minimise generation of stormwater effects	Design/layout of development, incorporation of natural elements
	Targeted minimisation of adverse effects	At source/on site flow and quality management devices
	Broad scale minimisation of adverse effects	Communal/subcatchment scale mitigation
Mitigation	Direct mitigation of adverse effects	local mitigation of receiving environments
	Indirect/off set mitigation of adverse effects	Wider mitigation of receiving environments

Implementation of this management approach is hierarchical. That is, primary emphasis (particularly in greenfield development) is on reducing the generation of adverse effects, followed by minimising them on-site and then minimising at a sub-catchment scale prior to consideration of receiving environment mitigation. It is recognised that depending on individual circumstances, this may not always be possible and in this case a combination of techniques will be required.

This approach requires a policy shift for stormwater management through the Unitary Plan with a focus on:

- Aligning and integrating stormwater management planning and land and infrastructure development, both for new and redevelopment;
- Ensuring greenfield development delivers water-sensitive design and quality stormwater infrastructure and minimises the creation of new, or exacerbation of existing adverse effects on communities and the natural environment;
- Using intensification and managing redevelopment as an opportunity to incrementally reduce existing adverse effects through on-site control of stormwater

contaminants and flows, land use planning, sustainable development, restoration of natural systems, and appropriate infrastructure capital works solutions;

- Focusing on existing stormwater management issues such as network capacity, aging infrastructure, flooding, stormwater quality and stream, ecological and natural values in areas identified as priorities for intensification.

4.3 (4) CONCLUSION

The proposed management options identified above and included in the proposed Unitary Plan are considered the most appropriate approach to achieve the outcomes sought for stormwater through the Unitary Plan. In particular, they:

- Address the key issues for stormwater management in the Auckland region, including minimising the adverse effects of new development and the progressive reduction of existing adverse effects (see section 1.2).

- Enable deficiencies in the current stormwater management approach to be addressed (see section 1.6) and provide a more consistent, clear and equitable approach across the region.

- Give effect to the national requirements of the RMA, NPSFM, NZCPS and HGMPA, and in particular expectations regarding improving and maintaining the quality of freshwater systems and downstream marine environments.

- Enable the multiple aspirations of the Auckland Plan, including community and Mana Whenua, to be met to enable Auckland to grow and intensify in a sustainable manner consistent with the green growth vision.

- Provide for intensification in a way that seeks to reduce adverse effects instead of incrementally increasing effects.

- Minimise cost by requiring improvements in stormwater management to be implemented as part of redevelopment.

- Focus on problem issues (HCGAs) or sensitive areas (SMAFs).

- Provide greater clarity and certainty to site owners and developers to enable efficient design, development and consenting processes.

It is recognised that the proposed provisions will likely increase development costs, particularly in SMAF areas and in respect of addressing HCGAs. However, improved stormwater management is required to achieve multiple community and environmental management outcomes and costs have been minimised by providing for upgraded stormwater management to occur at the time of development/redevelopment.

5 DISCUSSION ON THE UNITARY PLAN

It is generally accepted that the stormwater provisions of the Unitary Plan are necessary and represent the best approach to minimising future effects in greenfield developments and provide the opportunity to remedy past effects at the time of redevelopment of existing properties. It has been noted that this approach is reasonable and equitable. Although there no context is provided as to what equitable means. However, it has been

interpreted, in terms of the PAUP, that equitable means that the ratepayers of Auckland, as a whole, will be avoiding future effects and remedying past effects. This presumably is in consideration of intergenerational equity.

The environmental outcomes sought for stormwater in the Proposed Unitary Plan, as written, are to be achieved by regulation alone. This may be seen as a "sticks only" approach. Whereas, an alternative approach may be to include the use of the complimentary policies of regulation and financial incentives, i.e. "sticks and carrots" to not only achieve the outcomes sought but with active community support.

In other jurisdictions policies that encourage behavioural change bring about environmental improvements at a much faster rate than those that don't. For instance, green practices should be rewarded with lower levies or fees and polluting practices that have a greater demand on resources should be discouraged with higher levies or fees.

One of the main changes to managing stormwater from new development in the Unitary Plan is more focus on private drainage and at source management. However, there is clear evidence from overseas that if incentives are not provided to property owners that have on site stormwater management devices they are less likely to be properly maintained (compare with the experience in NZ with septic tank systems). And, if property owners with high percentages of impervious area on their sites are not incentivised to reduce the off site effects by adopting simple measures to improve stormwater management such as installing raintanks, disconnecting downpipes or increasing pervious area, poor environmental practices will continue.

While it is anticipated that stormwater improvement will occur in existing urban areas at the time of redevelopment this process can be hastened and improved through changed behavior and Council involvement in the implementation of communal devices from funds raised through a more equitable stormwater levy or fee structure.

While it may be less clear whether the overall cost of development will increase as a consequence of the change of stormwater provisions it is clear that there will be a shift in the costs that are attributable to the developer and to the home owner, with the home owner having to fund the construction, ongoing maintenance and eventual replacement of onsite devices to retain and detain stormwater.

A significant issue that then requires examining is the level of intragenerational equity that will exist between owners of homes that are constructed under the stormwater provisions of the Unitary Plan and owners of homes constructed under previous regulations.

Intragenerational equity is the principle of equity between people of the same generation. This is separate from intergenerational equity which is the well understood principle of equity between present and future generations. Intragenerational equity includes fairness in the utilisation of resources among members of the present generation or community.

When the principle of intragenerational equity is applied to use of Auckland's urban waterways, streams and estuarine environments under the stormwater provisions of the Unitary Plan there will be considerable inequity that will exist. For example, compare the residential lot with a dwelling clad in galvanised iron roofing and 90% impervious area and no retention or detention devices to a new dwelling constructed with inert materials in a SMAF1 area with 60% impervious. The separate effects on the environment are quite different.

Intragenerational equity, as applied to stormwater management, can be measured by

- Cost of construction, maintenance, compliance and depreciation of the amount of onsite stormwater infrastructure
- The amount of impervious area and the load of contaminants discharged
- Property rates as they apply to the stormwater component of the general rate

Already there is inequity between the different demands properties have on the stormwater system and the environment be they related to impervious area, high contaminant materials or peak flow rates etc.

Now, if owners of homes in greenfield or significant brownfield redevelopment, constructed under the stormwater provisions of the Unitary Plan are managing stormwater flow and quality on site but paying the same rates as owners of properties of equal value, but constructed under different regulations with no onsite stormwater management devices, inequity is increasing.

The future management of this developing situation is analogous to how trade waste is managed in Auckland by Watercare, with onsite pre-treatment of the trade waste and subsequent discharge to the sewer. The charges for trade waste based on a 4 level tariff system (Auckland Council, 2013 (5)).

6 AUCKLAND STORMWATER BYLAW

Council has also developed a bylaw which is complementary to the Unitary Plan which recognises the extent to which private drainage forms the future of the stormwater network across the region and the effect that private drainage can have on the public network. Parts of the proposal for the Bylaw are noted below.

6.1 THE PROPOSAL

Auckland Council is proposing the making of the Stormwater Bylaw 2014 (Auckland Council, 2014 (6)) and the revocation of Auckland's legacy stormwater management bylaws, which are:

- Auckland City Council Bylaw No 18 Stormwater Management 2008;
- Papakura District Council Stormwater Bylaw 2008; and
- Chapter 21 (Stormwater drainage) of the Rodney District Council General Bylaw 1998.

The Stormwater Bylaw 2014 (the proposed bylaw) will introduce new stormwater regulations to the legacy areas not currently regulated by a bylaw. To enable Auckland Council to respond appropriately to different local conditions across Auckland, provision is made in the proposed bylaw for controls to be made by the council by publicly notified resolution. This will enable the council to provide measures suited to local conditions (for example different ground soakage standards, depending on soil types). This approach may also be useful in moving from the different standards and practices in the different legacy areas to a consistent region-wide approach, as and when appropriate.

The key purpose of the proposed bylaw is to provide a consistent regulatory approach for stormwater management across Auckland.

The outcomes sought from the proposed bylaw include:

- Ensuring the development, management and protection of the public stormwater network and private stormwater systems to a consistently high standard throughout Auckland.
- It is stated that this is to be achieved by enforcing Council's Code of Practice for Land Development and Subdivision (Chapter 4) which sets out minimum standards for stormwater infrastructure development.
- Requiring on-site stormwater devices on private land to be properly maintained, as they form part of the wider stormwater network.
- It is stated that this is to be achieved by requiring property owners to effectively operate, maintain and eventually replace private stormwater systems.
- Managing works and activities on private property that have adverse impacts on the public stormwater network.
- It is stated that this is to be achieved by inspection, monitoring and enforcement of provisions of the bylaw.

The Stormwater Bylaw is complementary to the Unitary Plan and will provide the additional regulation required to manage the development and maintenance of the stormwater and land drainage network.

7 THE AUCKLAND RATING SYSTEM

The current Auckland Council rating system (Auckland Council, 2012 (1)) is made up of,

- Uniform annual general charge
- General rate, based on property value
- Rate differentials (to reflect different levels of service between say, urban and rural areas)
- Targeted rates (e.g. waste management)

Rates provide approximately 45% of council's revenue with the rest coming from grants subsidies, development and financial contributions, user charges and fees.

The general rates fund, in part, council activities which are currently apportioned on the following percentages,

Table 2: Auckland Council – General Rates Apportionment

Themes	Percentage
Stormwater and flood protection	7
Economic development	7
Built and natural environment	9
Community	11
Governance	4
Transport	33
Lifestyle and culture	28
Other	1

Under the current rating system approximately 7% of the general rate charged to ratepayers is applied to stormwater and flood protection. Therefore, in monetary terms properties of the same value will be charged the same amount for stormwater and flood protection but are increasingly less likely to receive the same level of service.

The stormwater funding requirements for most Councils is increasing at a faster rate that the overall funding requirements as stormwater management practices change, past effects are remedied and deferred maintenance is deferred no longer. In addition, the competing needs within Councils for a slice of the revenue can often mean the politically less attractive services have budget reductions, this can be a reality for stormwater, especially during years when there is little flooding.

The trend in the United States of America is for the stormwater component of the general rate to be separated out and a fee structure developed. The fee structure is transparent and is directly related to the impacts that properties have on the network and receiving environment and is based on an agreed programme of works.

Four of the most popular stormwater charging systems in use are described below,

8 STORMWATER FUNDING MODELS

8.1 STORMWATER AS A SERVICE

The provision of stormwater infrastructure and the implementation of stormwater management programmes by local government creates a service benefit for the properties served (USEPA, 2006 (12)). Benefits include drainage of private property and road networks, protection and enhancement of local streams, waterways and estuarine environments, flood control, protection of infrastructure and open space management.

Clearly a long-term obligation is created when stormwater infrastructure is constructed and stormwater programmes are implemented. Specifically, all the stormwater infrastructure that is created, public or private, as a result of new development or redevelopment, must be maintained in perpetuity.

The significant and continuing capital, operational and maintenance requirements for stormwater sewer systems, stormwater quality devices, flow management facilities, flood control schemes, wetlands, etc., are services that are largely provided by the local government stormwater departments.

8.2 SERVICE FEE DESIGN CONSIDERATIONS

There are many reasons for local governments to adopt service fees to fund their stormwater programs. These include:

- Generation of sufficient revenue to meet capex and opex needs;
- Apportioning costs among various segments of the community;
- Support a growth strategy and resource life-cycle asset management,
- Reduce a general revenue budget problem by removing stormwater from that source of funding and substituting service fees.

The design of service fees must meet general and technical standards. Selection of a preferred approach is not a purely technical issue. It is not required that the very best technical approach be selected. A user fee rate structure that fits local practices and meets basic industry standards may serve a community better than a highly detailed, very expensive approach that is confusing to the public. In many cases, decisions are influenced by practical considerations like public perceptions of equity, implementation and upkeep costs, timing, and ease of understanding. The following considerations are among those commonly used to evaluate and select preferred methods for design of user fee rate structures.

8.3 EQUITY

Attainment of equity is a fundamental objective in the design of service fee structures, and one of the primary justifications commonly cited for establishing a utility. Equity has both technical and perceptual aspects. Service fee structures are designed to attain "equity" as a fair and reasonable apportioning of cost of providing the needed services and facilities. Fees are expected to have a substantial relationship to the cost of providing the services and facilities to each customer.

Equity must be weighed against simplicity and clarity. The best utility fee structures generate charges that clearly and simply relate to the services and facilities being provided. A utility service fee structure might be highly equitable in terms of assigning costs according to service demands, yet still be politically unpopular if it is too complex for the public to grasp the linkage between service, costs, and charges. In the case of stormwater management, most people can understand that replacing natural earth with impervious pavement or structures will diminish infiltration of water and increase runoff. Thus, fee structures based in some manner on impervious area and gross area are common. A realistic objective is to be consistent within generally accepted technical standards that most people will view as fair.

8.4 SERVICE FEE METHODOLOGIES

8.4.1 SERVICE FEES

In most instances, service fees are cost-based, i.e. they are designed to reflect the impacts that each property has on stormwater service demands and thus the cost of

providing facilities and operational and support activities. Such costs are primarily a function of peak stormwater runoff rate, total volume of discharge, and pollutant contributions, but design practices for stormwater service fees and assessments have yet to settle upon a single common standard or even a generally-accepted best model for calculating charges.

Empirical studies have demonstrated that impervious surface area on a property is the single most significant factor influencing all of these impacts. Impervious area is also relatively easy to identify and quantify numerically and is the most common parameter used in stormwater service fee calculations. However, the impact of a given area of impervious surface may also be influenced by its shape, slope, surface condition, vegetation, and nature of its discharge to a conveyance conduit or channel.

8.4.2 SERVICE FEE CREDITS

Many communities have modified basic stormwater rate design practices to accommodate local circumstances. Perhaps the most widely-used modification to basic rate structures is application of a credit adjustment to service fees. Credits are typically conditional, i.e., they are premised on continuing specified performance by the customer. If the specified performance is not maintained, credits may be rescinded. The concept is similar to industrial pre-treatment credits commonly provided wastewater customers to reduce strength of sewage discharged into public systems.

Stormwater service fee credits are most commonly provided for properties that have on-site retention or detention facilities. In most cases retention or detention systems are designed to approximate pre-development conditions or to meet capacity limitations of downstream facilities. Such controls reduce capacity requirements (and cost) of downstream systems and will, if properly designed and maintained, enhance water quality. Credits have also been given for facilities or activities that assist in provision of services or reduce the public cost of providing services.

Credits have also been adopted in some jurisdictions for public and private schools providing approved water quality education programs. The rationale for the latter credit is that education can be regarded as a minimum control measure. If not provided by local schools educational programmes the service would have to be performed by the stormwater management entity at additional cost to the ratepayers.

8.5 EXAMPLE STORMWATER FEE METHODOLOGIES

The fee structure concepts described below are typical of those adopted in the more than five hundred communities that have established stormwater utilities or special districts. Direct comparison with fee structures used in specific communities is not productive, however, since the general approaches described should be viewed in the specific context of the local needs, priorities, and circumstances of each community.

Generally speaking, any fee structure that incorporates gross area tends to reduce the proportion of the service costs allocated to commercial and other intensely developed properties and increase the proportion of costs assigned to residential and less intensively developed properties.

Example stormwater fee structures described base stormwater fees on:

- Impervious area;

- A combination of impervious area and gross area;
- Impervious area and the percentage of imperviousness; and
- Gross property area and the intensity of development.

8.5.1 IMPERVIOUS AREA

Stormwater fee structures based solely on impervious area have been widely used. They are simple, the concept is easily understood by the general public, and is generally perceived as equitable. Impervious area fee structures reflects a philosophy of allocating costs based on each property's contribution of runoff to the system. Large expanses of roofs and paving in shopping malls and other commercial and industrial business areas are highly visible to the general public, and most people understand the hydrologic impact of covering natural ground with paving and rooftops. The approach is generally consistent with services fees for wastewater services, wherein fees are based on the amount of water used and strength of effluent discharged to the public wastewater treatment plant.

8.5.2 IMPERVIOUS AREA AND GROSS AREA

Both total property area (gross area) and impervious coverage of properties influence amount, peak rate, and make up of stormwater discharged to public drainage systems. A combined impervious area and gross area fee structure can account for both factors. Most stormwater fee methodologies utilise one or the other parameter in calculation of fees. A few use both parameters to derive percentages or ratios used in fee calculations. The concept underlying an impervious/gross area fee structure is relatively easy to explain and grasp. It is consistent with the public's general understanding of hydrology and the impact that both gross area and impervious coverage have on stormwater runoff. This type of fee structure tends to allocate more of the cost burden to lightly developed and undeveloped properties than methodologies that are based strictly on impervious area. Depending on the weighting factors and/or cost allocations, however, smaller properties that are almost entirely covered with impervious surfaces could conceivably be charged more than larger properties that are undeveloped or very lightly developed with little impervious coverage.

8.5.3 IMPERVIOUS AREA AND PERCENTAGE OF IMPERVIOUS COVERAGE

Under this fee structure amount of impervious area and impervious percentage are both used to calculate service fees, dictating that data on both impervious and gross area be used. Gross area is not relevant to the service fee calculation, except that it is needed to determine the percentage of imperviousness. Under this approach impervious area of each property is charged at varying rates depending on the percentage of imperviousness of the subject property. Each square metre of impervious area is typically charged more as the percentage of imperviousness increases. Because this fee structure is based on impervious area, undeveloped land is often not charged.

Some anomalies may occur in service fees that result from this methodology. Consider two properties of different sizes with the same amount of impervious coverage. Because its percentage of imperviousness could be a lot higher, the smaller property could be charged more than the larger property.

8.5.4 GROSS AREA AND INTENSITY OF DEVELOPMENT

Fee structures based on the gross area of each property and its intensity of development are also common. An intensity of development factor is usually very similar to the coefficient of runoff. The term "intensity of development factors" is commonly used rather than a "coefficient of runoff", because the relationship of intensity of development to stormwater runoff is easily grasped.

If applied to every lot, this methodology requires that gross area be determined for all residential as well as non-residential properties and an intensity of development rating be assigned to each. Most communities using this method have opted to apply a simplified service fee or schedule of fees to one or more categories of residential property, but there is no uniform practice. Non-residential properties are usually categorized into five to ten descriptive groups ranging from “undeveloped” to “very heavily developed”. If a flat-rate residential charge is not used, all residential properties are typically assigned to one or two of the intensity of development categories.

9 CONCLUSIONS

Asc stormwater regulations change to require more at source stormwater management a growing inequity is developing between different groups in the community in the amount charged for the stormwater service and the respective demands on the stormwater network and the effects on the receiving environment.

Equity can be restored through the development of a stormwater service fee model. The design of such a model can be relatively straightforward based on proven fee structure methodologies and the ability to measure property characteristics using GIS technology and other council record systems.

Fee structures are readily understood by the public and have been proven to change behaviour (compare with metering water supplies)

Plan objectives could be more quickly achieved with a fee structure that incentivises the use and good management of on site systems and discourages past stormwater practices that have created legacy issues in our streams and harbours.

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