RULES RELATING TO STORM DRAINAGE STANDARDS

RULES RELATING TO STORM DRAINAGE STANDARDS

Sections that underwent revision

§1-1 PURPOSE

§1-2 MODIFICATIONS

§1-3 DEFINITIONS

§1-4 SECTION I – STANDARDS FOR FLOOD CONTROL

§1-5 SECTION II – STORM WATER QUALITY

§1-6 REPEAL

§1-1, PURPOSE

These Rules address requirements for both storm runoff quantities for flood control as well as storm runoff quality and reflect the most recent changes to Federal, State, and County requirements related to the quality of storm water discharges. By establishing criteria to address water quality, the City and County of Honolulu is satisfying Federal Regulatory requirements to control the discharge of pollutants in storm water as specified in the Clean Water Act as amended by the Water Quality Act of 1987.

These standards are not intended to limit the initiative and resourcefulness of the engineer in developing drainage plans, or be viewed as maximum limits in design criteria. More stringent criteria should be used where reasonable.

§1-2, MODIFICATIONS

A. The Director may modify provisions of these rules whenever:

1. The land to be developed is of such a size and shape or is affected by location or geological or topographical conditions, or is devoted to such uses that it is impractical or not economically achievable in the particular case to conform fully to these rules.

was changed to:

A. The Director may modify provisions of these rules whenever:

1. Full conformance to these rules is not achievable because of the size and shape, location or geological or topographical conditions, or land uses.

§1-3, DEFINITIONS

Terms Added

Biofiltration

Disturbed Area

Evapotranspiration

Impervious Surface

Infiltration

Low Impact Development

New Development

Site Design Strategies

Source Control BMPs

Treatment Control BMPs

Terms Revised

Redevelopment

DISTURBED AREA

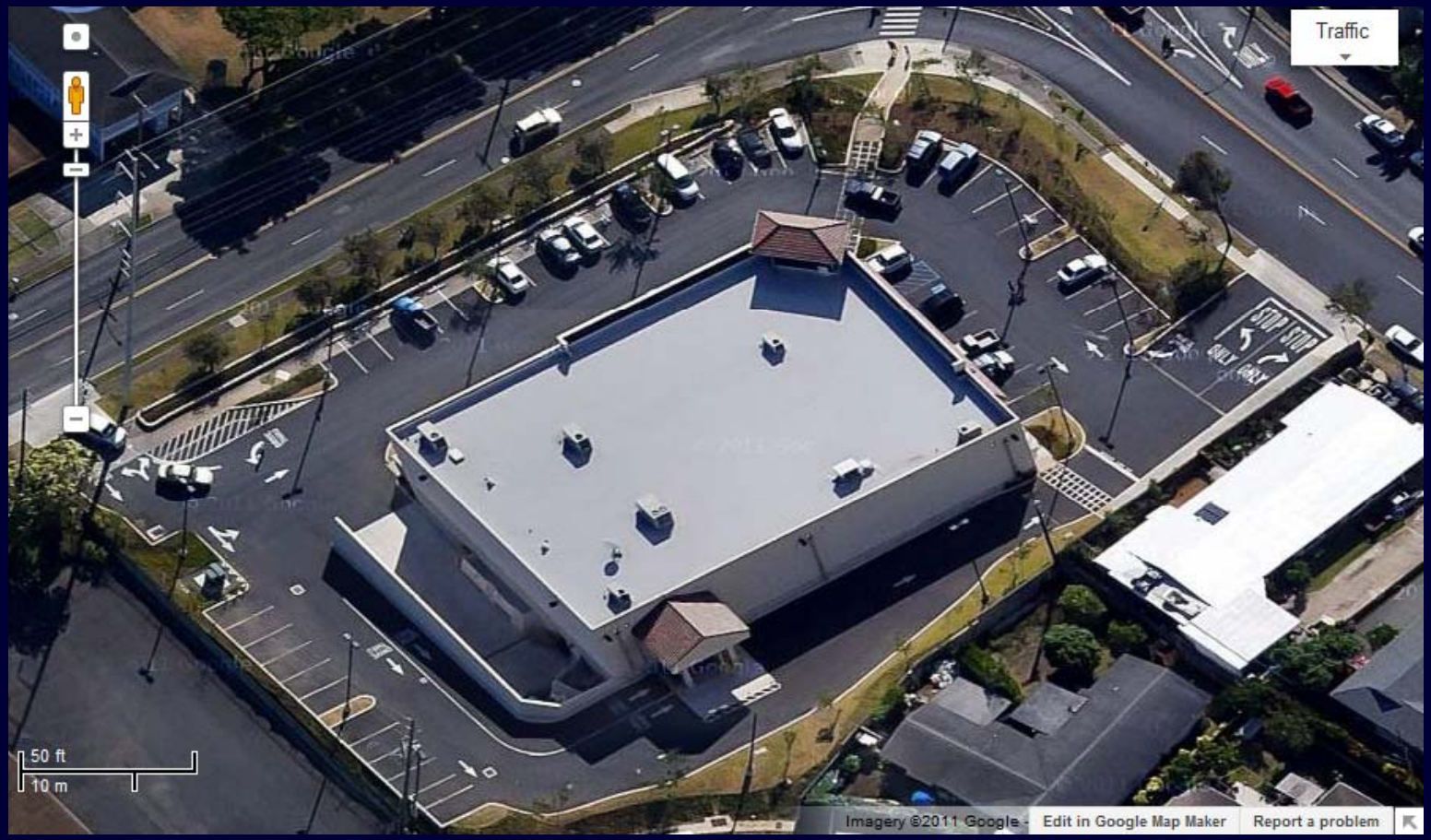
The area of the project that is expected to undergo any disturbance, including, but not limited to excavation, grading, clearing, demolition, uprooting of vegetation, equipment staging, and storage

Areas <u>not</u> considered to be Disturbed

- Areas which are cleared, graded, and/or excavated for the sole purpose of landscape renovation
- Areas which are cleared, graded, and/or excavated for the sole purpose of growing crops

IMPERVIOUS SURFACE

A surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/ storm water, including rooftops; walkways; patios; driveways; parking lots; storage areas; impervious concrete and asphalt; and any other continuous watertight pavement or covering



NEW DEVELOPMENT

Land disturbing activities; structural development, including construction or installation of a building or structure, the creation of impervious surfaces; and land subdivision

SOURCE CONTROL

Low-technology practices designed to prevent pollutants from contacting storm water runoff and/or prevent discharge of contaminated runoff to the MS4

- Stenciling storm drain inlets
- Grading dumpster, fueling, and storage areas to prevent run-on & runoff
- Using dumpsters with lids
- Paving high risk areas with concrete instead of asphalt
- Covering fueling and storage areas

Gas station, Kapolei, HI

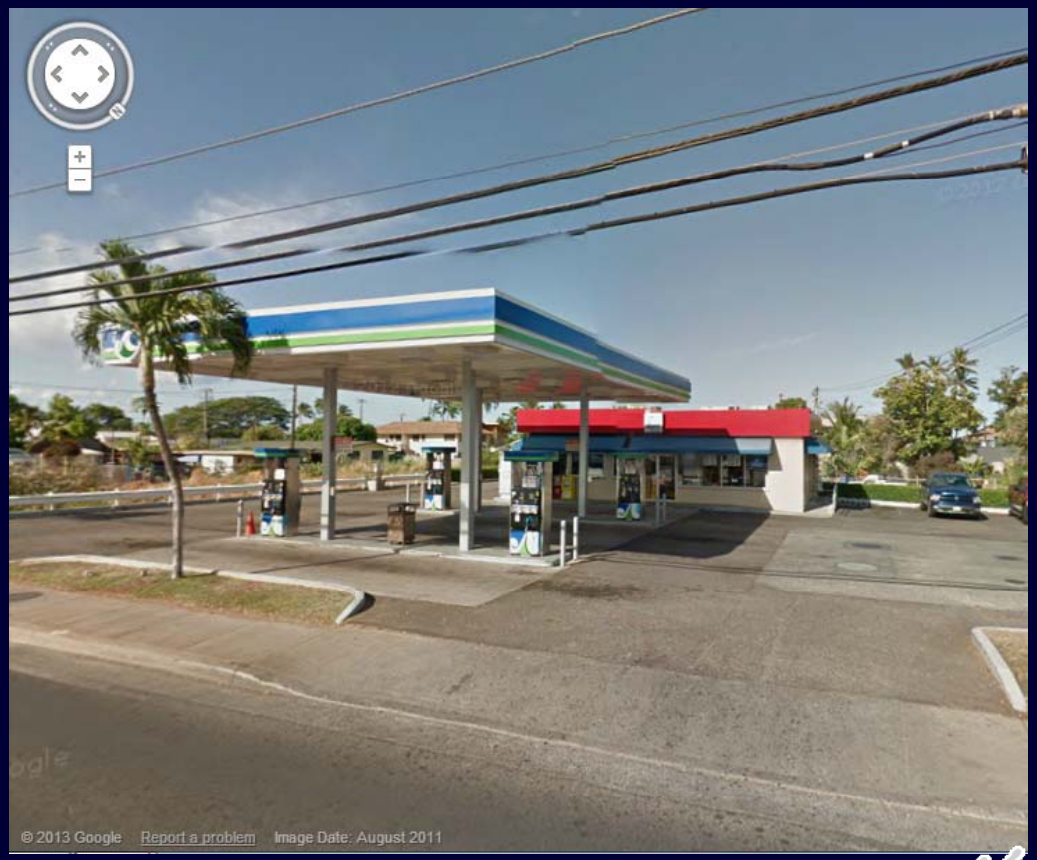
Approved Source Control BMPs

- Landscaped areas
- Auto. irrigation systems
- Storm drain inlets
- Loading docks
- Parking areas
- Vehicle/equipment repair
- Vehicle/equipment fueling
- Vehicle/equipment washing/cleaning
- Outdoor trash storage
- Outdoor material storage
- Outdoor work areas
- Outdoor process equip. operations

Details for each are provided in Chapter 2 of the City's Storm Water BMP Guide

Vehicle/Equipment Fueling

- Cover with a roof or canopy
- Pave with Portland Cement Concrete
- Use fuel dispensing nozzles with automatic shutoffs
- Post signs warning against "topping off" of fuel tanks



Loading Docks

- Cover all areas, or design them to preclude run-on and runoff.
- Do not allow runoff from depressed loading docks (truck wells) to discharge into storm drains.

- Grade to a drain that is connected to a dead-end.
- Pave with concrete instead of asphalt.

Outdoor Material Storage

- Place materials in an enclosure to prevent contact with runoff
- Slope the storage area towards a dead-end sump
- Direct runoff from downspouts/roofs away from storage areas
- Cover the storage area with an awning

Outdoor Work Areas

- Create an impermeable surface or use a metal drip pan
- Cover the area with a roof to prevent run-on
- Berm around the area perimeter to prevent run-on from adjacent areas
- Locate the work area away from storm drains or catch basins

REDEVELOPMENT

Development that would create or add impervious surface area on an already developed site, including expansion of a building footprint; addition to or replacement of a structure; replacement of an impervious surface that is not part of a routine maintenance activity; and land disturbing activities related to structural or impervious surfaces

Activities not considered to be Redevelopment

- Routine maintenance activities to maintain original hydraulic capacity
- Routine maintenance activities to maintain original purpose of facility
- Emergency redevelopment activity required to protect public health and safety
- Impervious surface replacement, such as parking lot and roadway reconstruction, which does not disturb additional area
- Repaving of existing roads

§1-5.1, PART I – WATER QUALITY CRITERIA

Revised Subsections

§1-5.1.B.1, Development & Redevelopment Included
§1-5.1.B.3, Project Applicability
§1-5.1.B.6, Management Practices to Meet Criteria
§1-5.1.B.10, Storm Water Quality Facilities Review
§1-5.1.B.11, Maintenance

Deleted Subsections

§1-5.1.C, Detention Based WQ Control
§1-5.1.D, Flow-Through Based WQ Control
§1-5.1.E, Detention Combined with Flow-Through Treatment
§1-5.1.F, Flow-Through Upstream of Detention Treatment

New Subsections

§1-5.1.B.2, Regulated Projects

What the Rules now specify

- Rules apply to all projects as defined in §1-5.1.B.2
- BMP sizing requirements apply to all new development projects that disturb at least 1 acre during construction
- BMP sizing requirements apply to all redevelopment projects that disturb at least 1 acre during construction
- Rules only apply to the addition of the redevelopment

§1-5.1.B.2, REGULATED PROJECTS

Projects are classified as follows:

Priority	Description
A1	Disturb ≥ 5 acres of land during construction
A2	Disturb 1 - 5 acres of land during construction
B	Disturb < 1 acre during construction, create at least 10,000 sq-ft of total impervious surface, and is a Retail Gas Station, Auto Repair Shop, Restaurant, or Parking Lot

What the Rules now specify

The Director may exempt projects from the application of these rules if projects are determined to have submitted ~~substantially~~ completed construction drawings and ~~substantially~~ completed site-specific drainage reports prior to June 1, 2013.

§1-5.1.B.6, MANAGEMENT PRACTICES TO MEET CRITERIA

What the Rules used to specify

- Post-Construction Treatment Control BMPs
- BMP at owner's discretion

What the Rules now specify

- Combination of multiple management practices based on the project's Priority
- BMP at owner's discretion (partially)

Priority A1 Projects (disturb ≥ 5 acres)

- All applicable Site Design Strategies
- All applicable Source Control BMPs
- Unless infeasible, retain with LID Retention BMPs, the Water Quality Volume (WQV)
- Unless infeasible, biofilter with LID Biofiltration BMPs, any portion of the WQV not retained
- Alternative Compliance if WQV is not retained or biofiltered

Priority A2 Projects (disturb 1 – 5 acres)

- All applicable Site Design Strategies
- All applicable Source Control BMPs
- Unless infeasible, retention or biofiltration of WQV
- Alternative Compliance if WQV is not retained or biofiltered

Priority B Projects

- Consider implementing LID Site Design Strategies
- All applicable Source Control BMPs

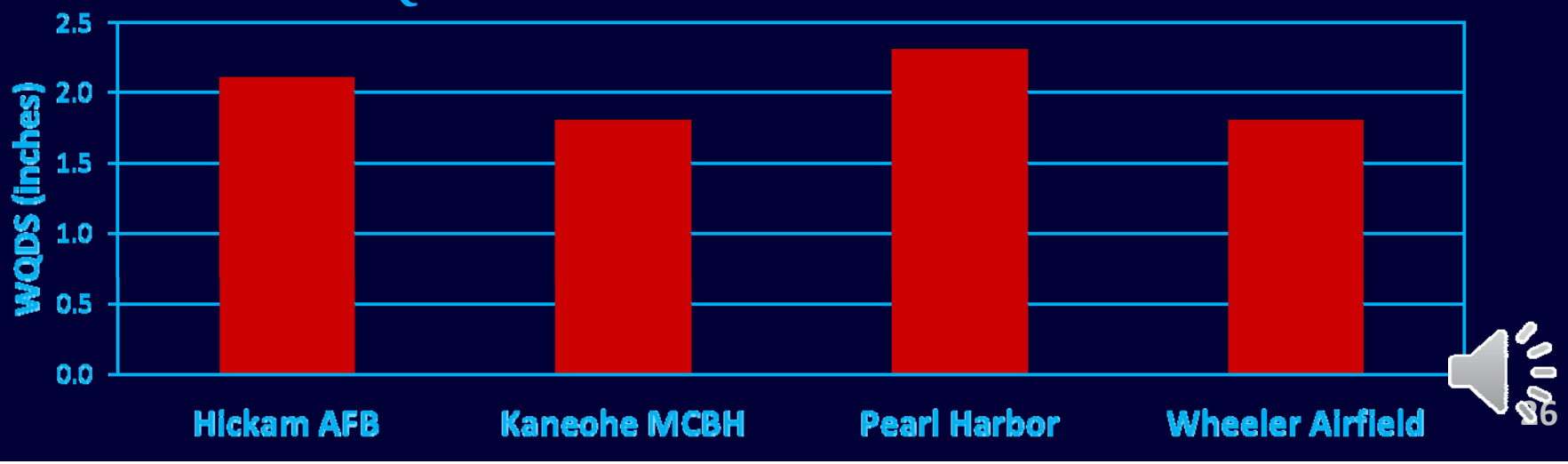
§1-5.1.B.6 references some other new terms:

- Water Quality Volume
- Infeasible
- Alternative Compliance

Water Quality Volume (WQV)

- Volume of runoff generated by a pre-determined precipitation event (the Water Quality Design Storm, or WQDS) that must be managed for water quality
- The City selected 1 inch as the WQDS

WQDS at Oahu Federal Facilities



How is Infeasibility Determined?

- Pre-established criteria for all Retention and Biofiltration BMPs
- Based on a review and analysis of other municipalities and state/federal agencies
- Exemption from a specific LID BMP may be claimed if at least one criterion for the BMP is met
- Applicant may propose for City approval a criterion not listed

Alternative Compliance Options

1. Either Harvest/Reuse or Treat on-site with non-LID BMPs, any portion of the WQV that is not retained or biofiltered
   - Detention Basin
   - Sand Filter
   - Manufactured Treatment Device

2. Retain or biofilter at an offsite location, the volume of runoff equivalent to the portion of the WQV that was not retained and/or biofiltered on-site
   - Proposed location must be approved by City
   - Applicant responsible for all costs, including maintenance

What the Rules now specify

- SWQR (Storm Water Quality Report) required for Priority A1 Projects
  - A SWQR presents a project's storm water quality issues and storm water quality management strategy, in a standard report format
- SWQC (Storm Water Quality Checklist) required for Priority A2 & Priority B Projects
  - A SWQC presents a project's storm water quality management strategy, in a simple checklist format

SWQR & SWQC Specifics

- Signed by Owner & Licensed Architect/Engineer
- Submittal Requirements

	SWQR (Priority A1)	**SWQC** (Priority A2)	**SWQC** (Priority B)
Construction Plan Approvals	✓	✓	
Building Permit Applications			✓

- WQ management strategy must be included in Master Plan, Discretionary Land Use Permit, or EA/EIS
- More details in Module 3…

What the Rules now specify

- Maintenance details specified in SWQR/SWQC, as applicable
- Treatment Control BMPs must be maintained regularly and inspected annually prior to rainy season
- Maintenance Activity Log must be kept for 5 yrs

Subsections A-D replaced in their entirety with:

§1-5.2.A Volume Based Storm Water Quality Control Facilities

§1-5.2.B Flow Based Storm Water Quality Control Facilities

§1-5.2.C Area Based Storm Water Quality Control Facilities

§1-5.2.D Demand Based Storm Water Quality Control Facilities

§1-5.2.A, VOLUME BASED STORM WATER QUALITY CONTROL FACILITIES

Volume-based BMPs shall be sized for the WQV:

$$WQV = PCA \times 3630$$

Where:	WQV	=	water quality volume (cubic feet)
	P	=	WQDS runoff depth (inches) = 1 inch
	C	=	volumetric runoff coefficient (unitless)
	A	=	drainage area (acres)

The volumetric runoff coefficient is calculated by:

$$C = 0.05 + 0.009I$$

Where:	C	=	volumetric runoff coefficient
	I	=	% impervious cover, expressed as a percentage

Infiltration Basin	Bioretention Basin	Enhanced Swale
Infiltration Trench	Permeable Pavement	Tree Box Filter
Subsurface Infiltration	Green Roof	Detention Basin
Dry Well	Vegetated Bio-Filter	Sand Filter

§1-5.2.B, FLOW BASED STORM WATER QUALITY CONTROL FACILITIES

Flow-through based BMPs shall be sized for the WQF:

WQF = CiA

Where:	WQF	=	water quality flow rate (cubic feet per second)
	C	=	runoff coefficient (unitless)
	i	=	peak rainfall intensity (inches per hour)
	A	=	total drainage area (acres)

- A Peak rainfall intensity of 0.4 in/hr shall be used
- For drainage areas containing multiple land uses, a composite weighted runoff coefficient should be used.

Vegetated Swale	Tree Box Filter
Vegetated Buffer Strip	Manufactured Treatment Device

§1-5.2.C, AREA BASED STORM WATER QUALITY CONTROL FACILITIES

Area based BMPs shall be sized such that:

- The size of the vegetated area receiving the roof runoff is at least 10% of the size of the roof area that drains to the downspout

<u>or</u>

- The flow path of the vegetated area receiving the roof runoff is at least as long as the flow path of the roof area that drains to the downspout

Downspout Disconnection

§1-5.2.D, DEMAND BASED STORM WATER QUALITY CONTROL FACILITIES

Demand based BMPs shall be sized such that:

- At least 80% of the total annual runoff is captured

<u>and</u>

- At least 80% of the total annual reuse demand is met

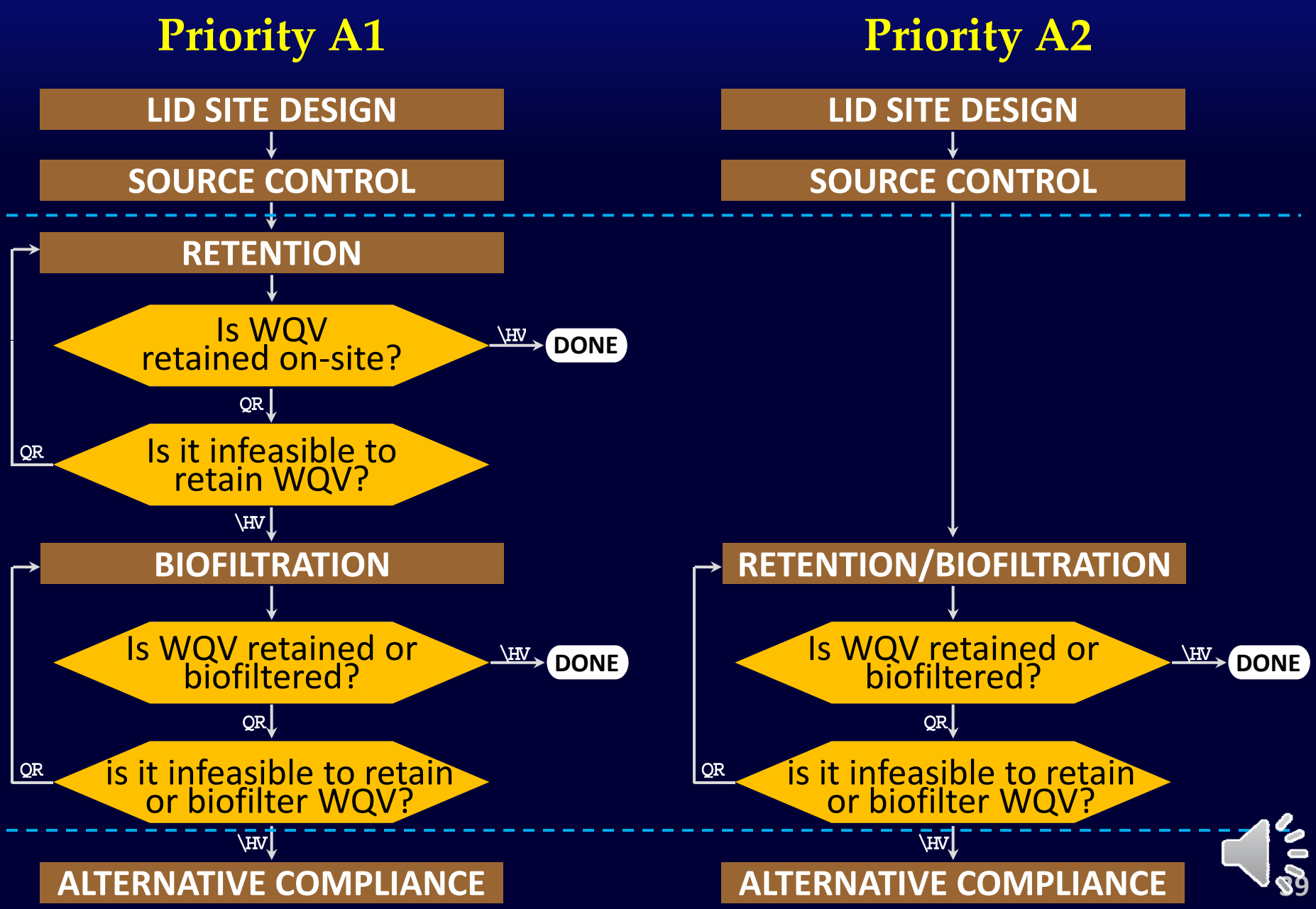
Harvesting / Reuse

Module Summary

SUMMARY – PROJECTS SUBJECT TO RULES

Priority	Description
A1	Disturb ≥ 5 acres of land during construction
A2	Disturb 1 - 5 acres of land during construction
B	Disturb < 1 acre during construction, create at least 10,000 sq-ft of total impervious surface, and is a Retail Gas Station, Auto Repair Shop, Restaurant, or Parking Lot

SUMMARY – STORM WATER MANAGEMENT REQUIREMENTS



SUMMARY – STORM WATER MANAGEMENT REQUIREMENTS

Priority B

CONSIDER LID SITE DESIGN

↓

SOURCE CONTROL

↓

DONE

SUMMARY – DOCUMENTATION REQUIREMENTS

Priority	Document	Submittal Requirements	
		Building Permit Apps.	Const. Plan Approvals
A1	SWQR		✓
A2	SWQC		✓
B	SWQC	✓	

SUMMARY – MAINTENANCE REQUIREMENTS

- Maintenance activities and responsibility specified in SWQR/SWQC, as applicable
- Treatment Control BMPs must be maintained regularly and inspected annually prior to rainy season (November 1)
- Maintenance Activity Log must be kept on file for 5 yrs

BMP Sizing Criteria

BMP Type	Sizing Criteria
Volume Based	WQV with rainfall depth of 1 inch
Flow Based	WQF with rainfall intensity of 0.4 in/hr
Area Based	10% of contributing area or 100% of contributing flow path
Demand Based	80% of total annual runoff is captured and 80% of total annual reuse demand is met

End of Module 2