Hawaii Department of Transportation-Highways Division
Statewide Stormwater Management Program
Permanent BMP Manual Requirements

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Agenda

- Introductions
- HDOT Stormwater Management Program PBMP Manual
- Thoughts on Low Impact Development
- Closing/Questions

INTRODUCTION: ABOUT ME

- Who am I?
- What is my background?
- What is my stormwater background?

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INTRODUCTION: ABOUT YOU

- Who are you?
- What is your stormwater background?
- What do you want to learn from this class?

PERMANENT BMP MANUAL

- Applicability
- Exemptions and Variances
- Project Planning Phase
- Project Design Phase
- Permanent BMP Checklist
- Review and Approval
- Stormwaterhawaii.com

BOTTOM LINE UP FRONT

Projects (new or redevelopment) that generate one (1) acre or more of new impervious area must incorporate LID storm water controls unless qualifying for exemptions or variances

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All projects (new development or redevelopment) that disturb (1) acre or more of land reviewed.

- Greater than one (1) acre of new permanent impervious surface requires LID PBMP

- Smaller projects (less than one acre new impervious) that have the potential to discharge pollutants to the MS4 may be required to install specific BMPs

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- All permanent BMP projects are required to install LID BMP(s)

- *However*: Some projects may qualify for exemptions and or variances from this requirement to install LID BMP(s). Projects that qualify for variance from LID must install alternative permanent BMPs approved by DOT-HWYS

EXEMPTIONS:

- Returns area to pre-development hydrologic conditions
- Does not discharge to State waters
- Operations and Maintenance Activities
  - Pavement Resurfacing etc
  - Baseyard Repairs
- Linear Projects
- Water Quality Improvement or Preservation
- Emergency

VARIANCES:

- Hydrogeological Constraints
- Physical Constraints
- Operational Constraints
- Other

VARIANCES: HYDROGEOLOGICAL CONSTRAINTS

Constraints	Safety Concern
Permeability	Soil under BMP basin invert does not allow for water to permeate less than 0.5 in/hr
Depth to Ground Water	BMP invert is closer than 3 ft depth to seasonally high groundwater table
Distance to Drinking Water	BMP is closer than 50 ft to nearest groundwater well for drinking
Distance to Septic System	BMP is closer than 35 ft to nearest septic system
Slope Stability	BMP and infiltration would destabilize slope or cause landslide
Structural Impacts to Buildings/Roadbed	BMP is close to the nearest building foundation or roadbed. Proximity is dependent on BMP type, but minimum is 10 feet distance
Sensitive Downstream Areas	Instituting BMPs would significantly affect downstream habitats

VARIANCES: PHYSICAL CONSTRAINTS

Constraints	Safety Concern
Space Constraints	Instituting LID BMPs to MEP doesn't yield enough treatment for WQDV
Site Slope	Usable flat area doesn't yield enough treatment for WQDV
Lack of Right of Way	Project is closer than 10 ft to the nearest property line and no memorandum of understanding or joint ownership has been established
Contaminated Subsoil	Project is in the vicinity of industrial contamination
Sensitive Community Site	Excavation for BMP would permanently damage a community resource (e.g. wildlife refuge)
Sensitive Archeological Site	Excavation for BMP would result in disturbance of remains or artifacts

VARIANCES: OPERATIONAL CONSTRAINTS AND OTHER

Constraints	Safety Concern
Strength/Loading Requirements for Pavement	BMP is closer than 10 feet to pavement
No Application for Water Reuse	Landscaping or green roof is not an option due to space, energy systems, electrical, or mechanical systems
Hazardous Operations	Nature of site's permanent operations leave potential for mobilizing pollutants via proposed BMPs

Constraints/Non Applicability	Description
Legality	Implementing a BMP in the project would violate Federal or State Law

IMPLEMENTATION: THE DESIGN VOLUME

1-inch. By the Total Drainage Area = Design Volume

WQDV= C x 1” x A x 3630

WQDV= water quality design volume in cubic feet
C= runoff coefficient (refer to PBMP manual)
A= total drainage area in ACRES
3630= conversion factor
1” represents the design storm depth (using a more conservative value is acceptable)

Table 6-1. Values of Runoff Coefficients, C

Type of Surface	Runoff Coefficient (C)
Rural Areas	
Concrete or asphalt pavement	0.90 - 0.95
Gravel roadways or shoulders	0.4 - 0.6
Bare earth	0.2 - 0.9
Steep grassed areas (2:1)	0.5 - 0.7
Turf meadows	0.1 - 0.4
Forested areas	0.1 - 0.3
Cultivated fields	0.2 - 0.4

IMPLEMENTATION:

- Calculate WQ Design Volume
- Collect site data:
  - Soil type
  - Depth to ground water
  - Perc tests
  - Site history
- Assess/Select LID BMPs to infiltrate, store, detain, evapotransporate, and/or bio-treat the WQ Volume

IMPLEMENTATION:

- Once 1 acre or more new impervious area is established, design for LID to treat the design volume
- If, due to variances, the complete volume cannot be treated, utilize LID where feasible and treat the remaining volume with alternative BMPs
- Consult with DOT-HWYS regarding any constraints that require a variance and alternative BMPs

(Con't)

- For smaller projects less than one acre that have the potential to pollute, apply source control. Such projects include:
  - Retail Gasoline Outlets
  - Automotive Repair Shops
  - Restaurants
  - Projects with Parking Lots with at least 10,000 square feet of total impervious area

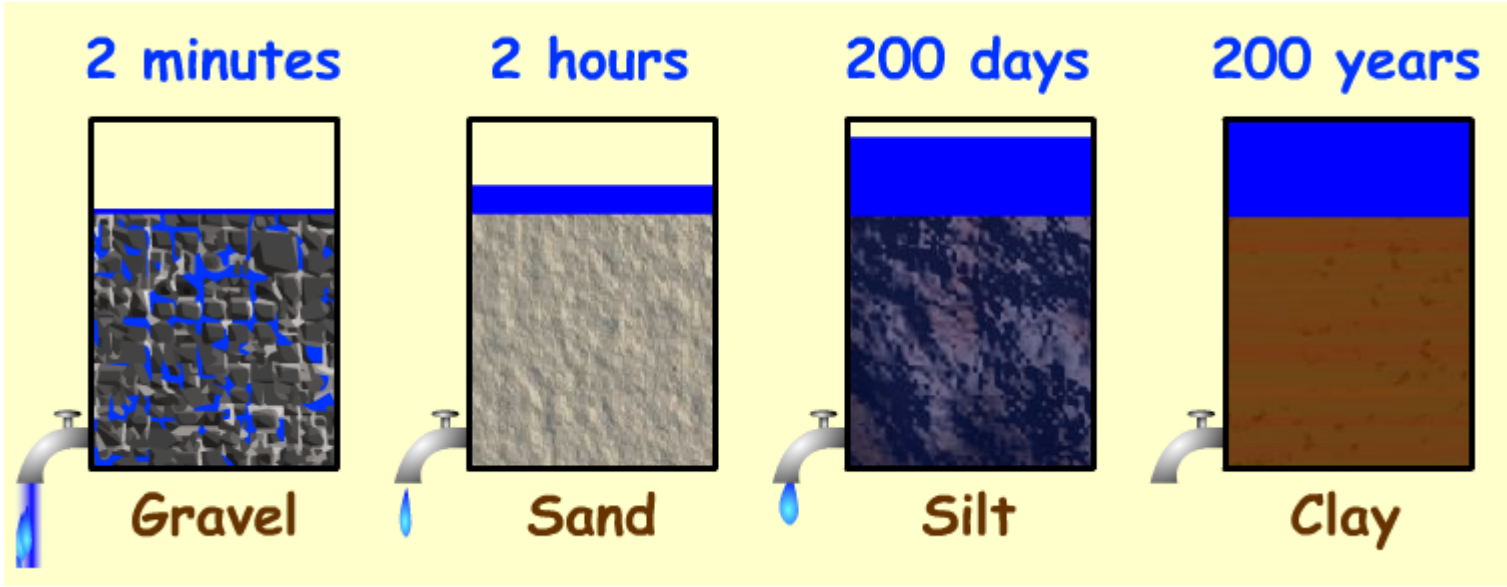
APPLICABILITY

- Contract Projects
- In-house projects
- Encroachment projects within DOT Right-of-Way
- Special conditions as determined by DOT, regardless of size of impervious surface
  - DOT projects that drain to sensitive receiving waters
  - Class I Inland Waters
  - Class AA Marine Waters
  - Selected 303d list water bodies

PROJECT PLANNING PHASE

- Consider permanent BMPs during impact assessment (EA, EIS) stage, as triggered by unified criteria
- Evaluate permanent BMP requirements during alternative studies
- Develop permanent BMP concept report
  - Identify study points and suitable outfalls
  - Determine regulatory needs
  - Develop permanent BMP footprints
  - Determine R/W needs
  - Prepare preliminary cost estimate

SOIL PERMEABILITY



Source: Michigan Technology University-Tech Alive website

DESIGN CONSTRAINTS

- Topography
- Available Right-of-Way
- Construction Budget

LIFE CYCLE CONSIDERATIONS

- Determine life of proposed permanent BMP facility.
- Determine maintenance costs over the life of the facility.
- Sum capital costs and maintenance costs and divide by the number of years.
- Compare annualized cost for each proposed alternative.

LOW-IMPACT DESIGN (LID) BMPS

- Definition
- Illustrative Examples
- HDOT Examples of LID BMPs

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WHAT IS LID?

LID – Low Impact Development

GSI – Green Stormwater Infrastructure

GI- Green Infrastructure

ESD – Environmental Site Design

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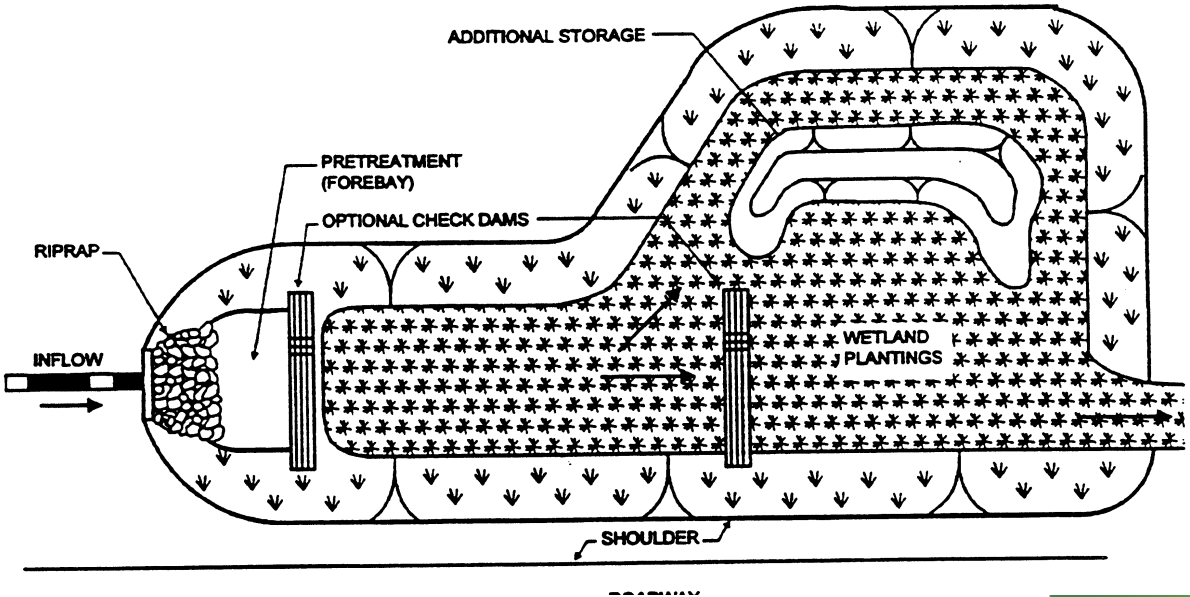
WHAT IS LID?

A comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds.

WERF Water Environment Research Foundation

WHAT IS LID?

LID is a strategy seeking to control storm water quality at its source, incorporating such elements as infiltration, retention, and biofiltration.



WHAT IS LID?

"Conventional BMPs are designed to treat the impacts of construction on the environment. LID BMPs are designed to prevent or reduce the impacts of construction on the environment."

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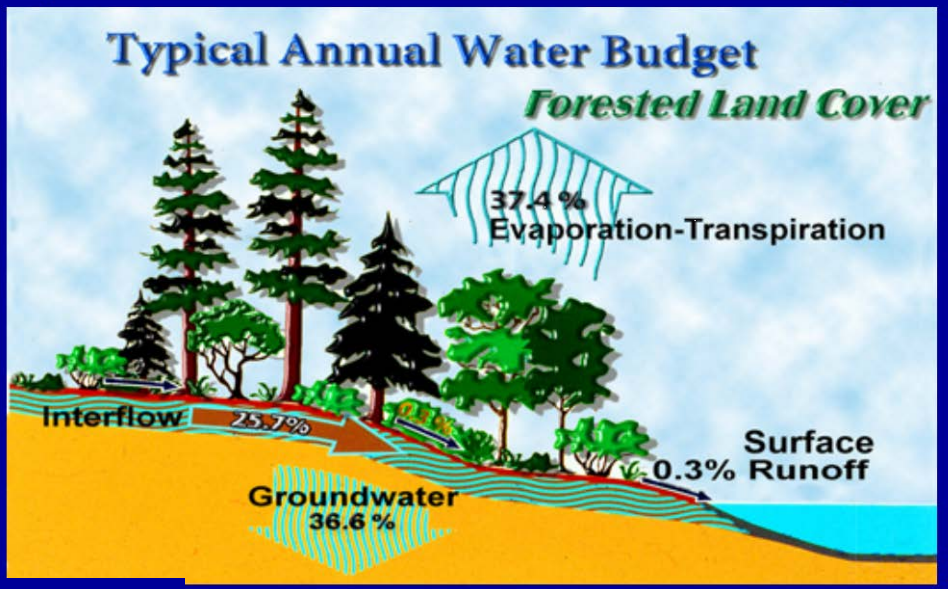
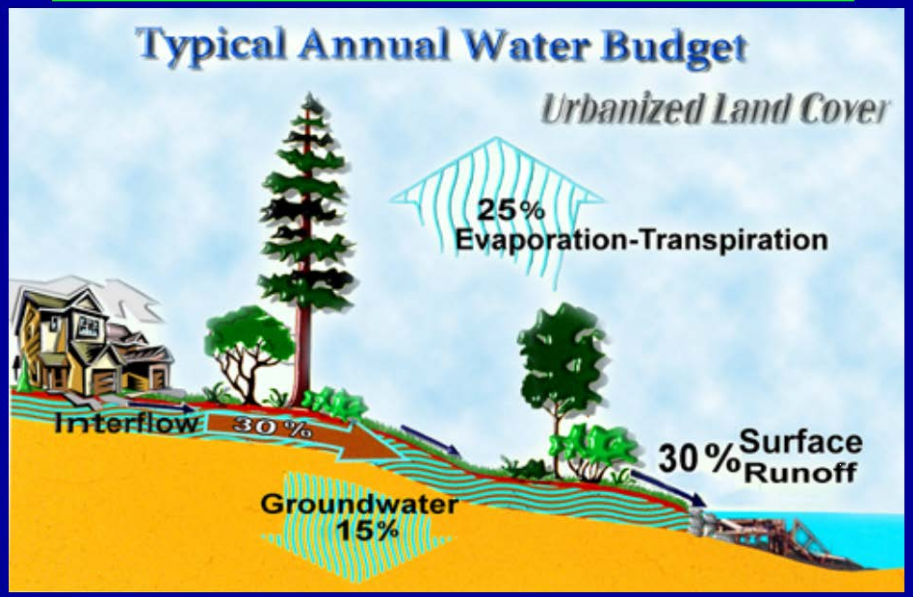
WHAT IS LID?

Natural Conditions



Developed Conditions



Puget Sound Water Quality Action Team

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WHAT IS LID?

-Green Roof
–Rain Gardens
–Bioretention
–Bioswales
–Infiltration Basins
–Vegetative Buffers
-Tree Box Filters
-Pervious Pavement
-Storage and Reuse

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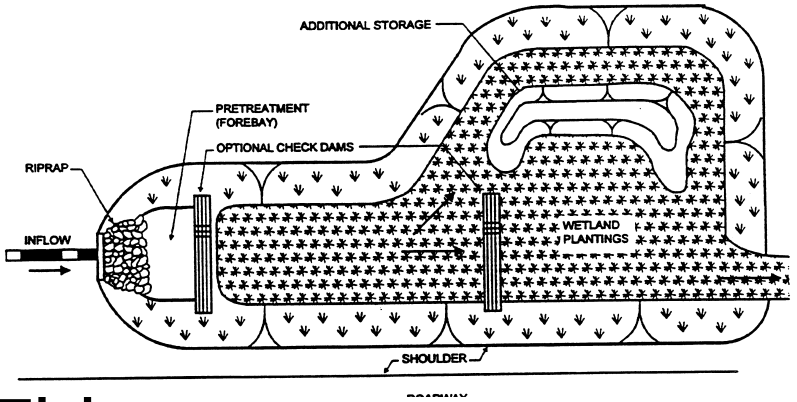
WHY IS LID IMPORTANT?

- Old vs. New
- Regulatory Driven
- “Better” Way to Do Things



LID is Important to You: It’s is Here to Stay!

LID LIFE CYCLE

- Same Steps as any Project
  a. **Planning**
  b. **Design**
  c. **Specifications**
  d. **HI Considerations**
  e. **Construction**
  f. **Inspection**
  g. **Startup and Maintenance Period**
  h. **Long term O&M**
- Usually a Small Part of Overall Project

LID CHALLENGES

- Stakeholder Buy-in
- Land Availability
- “Innovative” Techniques
- Maintenance Issues

PERMANENT BMP MANUAL

- Available online at:

  stormwaterhawaii.com

- April 2015
- Stay Tuned for Update…

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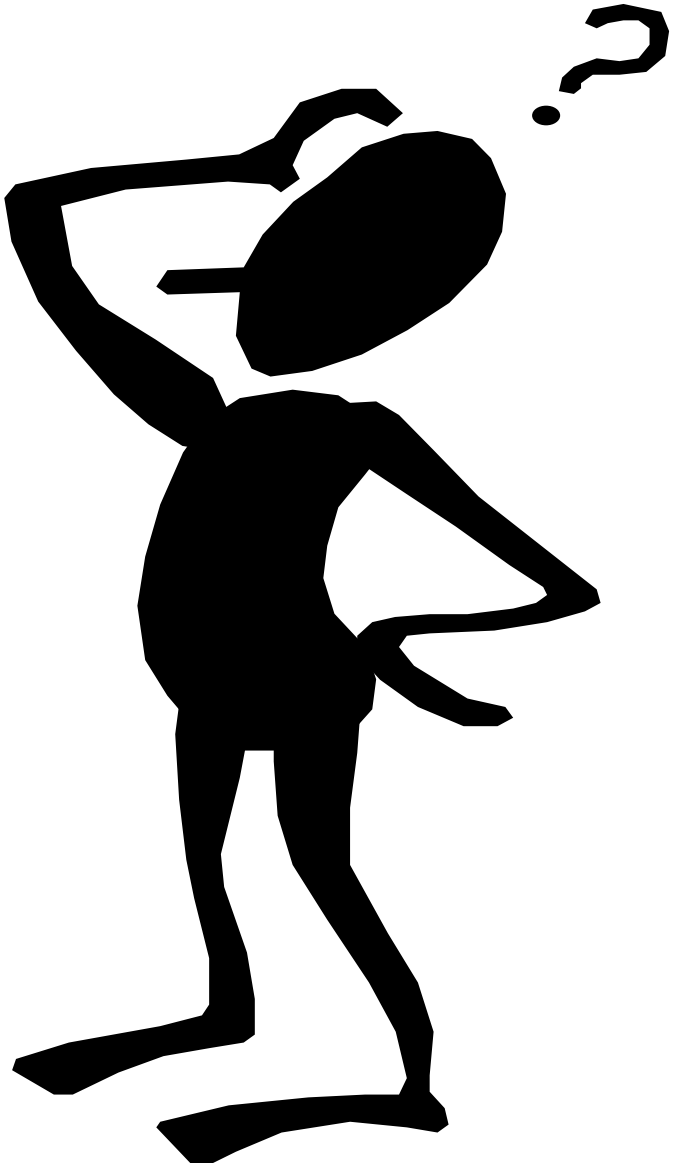
A QUESTION FOR EACH OF YOU…



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WHAT CREATIVE IDEAS WILL YOU COME UP WITH IN THE YEARS AHEAD TO:

- Reduce water pollution that originates in the highway system
- Find sustainable and cost-effective solutions for the long term
- Develop aesthetically pleasing designs for the motoring public
- Leave a low impact footprint on the beautiful Hawaiian environment

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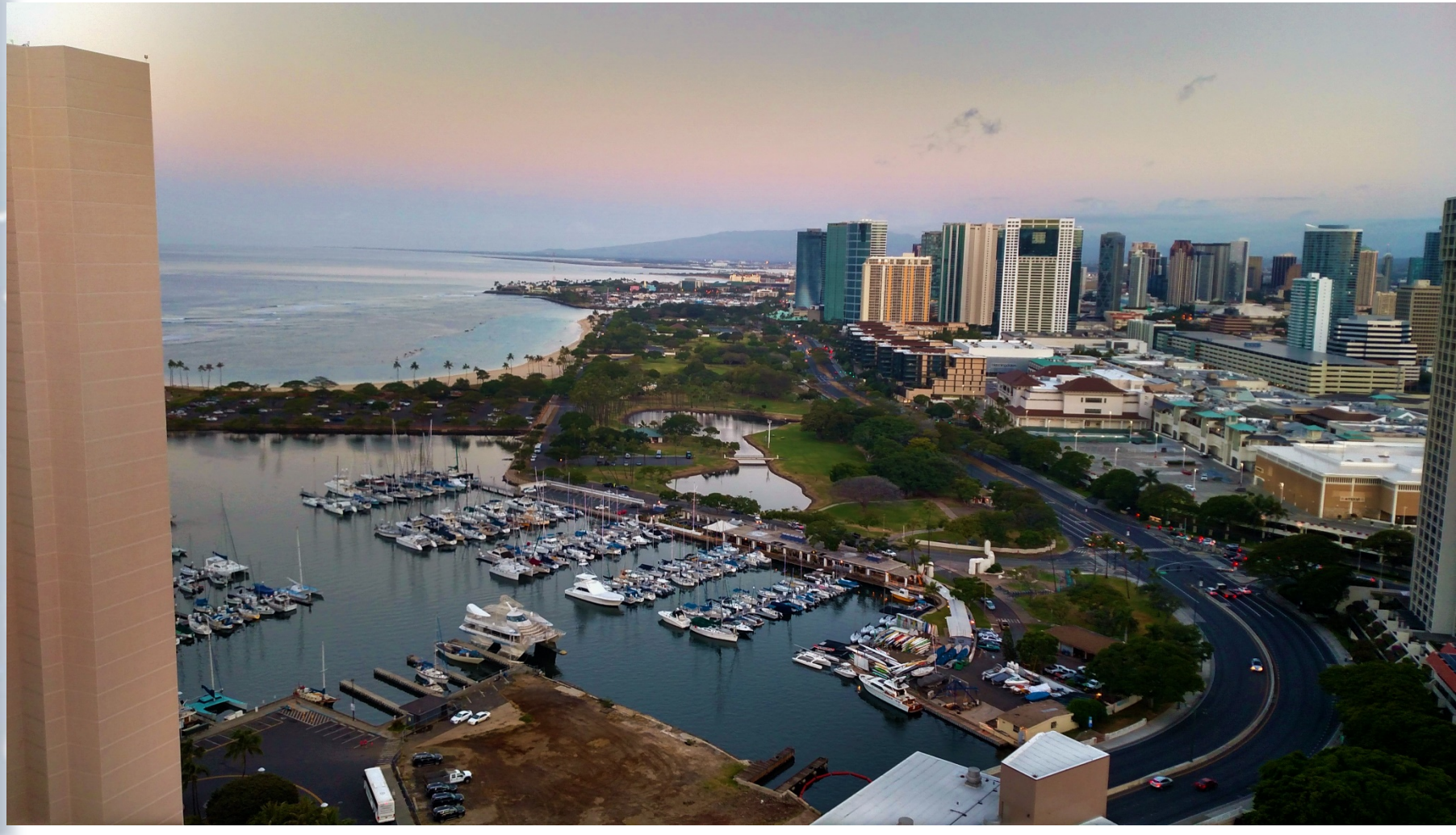
MAHALO!



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