CLARK COUNTY
WASHINGTON
proud past, promising future

DEPARTMENT OF ENVIRONMENTAL SERVICES

MEMORANDUM

TO: Oliver Orjiako

COPY: Jose Alvarez; Jen Langevin; Jeff Schnabel

FROM: Ron Wierenga

DATE: April 7, 2014

SUBJECT: VBLM assumptions for stormwater facilities

I understand that a question was raised about new stormwater regulations at the March 19th work session with the Board on the Vacant Buildable Lands Model. Specifically, the assumptions for land dedicated to public infrastructure for commercial and residential development. A request was made that you look into how new regulations may affect the need for more land as a result of larger pond sizes.

Jose Alvarez asked me if I had made any projections of increased land needed to accommodate the new stormwater regulations. In this memo I respond to Jose's question and provide additional information for your consideration.

I have not made any projections about the need for more land to accommodate new stormwater regulations. I understand that on a single-project scale it seems intuitive that a bigger pond means less land. But I don't think anyone has considered the theory at a landscape level. With new regulations there's also there's an underlying assumptions people won't continue business as usual when it comes to project planning and design, thus changes to other requirements or planning tools should moderate impacts.

I'm not sure which 'new regulations' people were talking about at the work session so I'll briefly address both high and low flow standards. The 2007 municipal stormwater permit brought strict regulations for high flows by requiring developers to match historic pre-developed runoff rates. If a development is using detention to control flows then this will result in detention ponds getting much larger in difficult soils. Developments are typically using infiltration to a higher degree in well-drained soils so the impact is much less; particularly if we move toward letting them put it in the public right-of-way.

Clark County didn't start requiring the permit's high flow standard until December 2011, but the majority of cities and counties in the state made the standard effective in 2009. I haven't, over the past four years that most of Washington State has been using this standard, heard of agencies modifying buildable lands model assumptions or adding more land to offset land dedicated to storm facilities. Perhaps more cities and counties will make that argument as comprehensive plan updates come around, we'll see.

The other new regulations that people may be talking about are permit requirements to incorporate Low Impact Development practices into our stormwater code and design manual by July 2015. The net impact of this change will essentially be a decentralizing the storm system. Runoff will be dispersed and collected by smaller facilities spread throughout private and public property, including the public right-of-way. Our recent road standards update has opened up possibilities of using the public right-of-way for managing runoff and should save more land for development. There will still be a need for ponds on some sites to manage high flows but they should be smaller than without LID practices managing low flows.

I worked with Jen Langevin in Clean Water to research a basis for adding land to the public infrastructure assumption. When looking for specific examples of needing additional land for stormwater facilities and regulations, there are few. The Puget Sound Water Quality Management Plan is a comprehensive state and federal strategy to protect and restore the biological health and diversity of Puget Sound. Nowhere inside of it or the case study, Urban Stormwater Management: Lessons from Australia and the United States, is there mention of need for more land to improve storm water management. One study does conclude that limiting the impervious surface ratio can aggravate urban sprawl. They propose that in reality, developers may purchase more land to bring the ratio of impervious to pervious surfaces down. This is somewhat irrelevant for us because we do not impose impervious area limits on developments.

The urban fringe is especially vulnerable; due to the land costs. Surveys have shown that most suburban residents are willing to spend the extra money for a larger lot and larger home, and it does not seem to effect residents' decisions on spending more money to build houses in the impervious surface regulated areas (Sung et. Al, 2010). On the other hand, in the technical guide for low impact development for Puget Sound they cite properly designed and implemented applications can significantly reduce stormwater pond size requirements (Hinman, 2012). Therefore, using low impact development techniques can reduce developable land that is used for infrastructure. In support of this statement, the EPA's document on smart growth states that when smart growth strategies are employed, such as more compact development, they disturb less land and accommodate more development (EPA, 2006).

Turning to other municipalities in our area we can look at how they are planning for stormwater facilities in their own regions as a basis. In the King County buildable land report they are projecting 12% land for public facilities including; drainage facilities, parks, and schools. Snohomish County projects 5% land for stormwater use. They also state that there is no loss in achieved buildable densities from stormwater facilities. This is due to the flexibility of plat design and planning. The city of Pacific, located in Pierce County, is projecting an additional 0.19% land for stormwater facilities in the future. On the other hand, the city of Buckley, also located in Pierce County, plans for 20% land for stormwater use. Multnomah County estimates stormwater facilities impact on residential capacity is low, less than 15%. There is a varied range here but we can see these counties are at or below 20% and many of their estimates include other public facilities or infrastructures.

Lastly, I encourage you to take a look at the existing VBLM assumptions to benchmark where developments have fallen on the spectrum. Attached to his memo are some of the case studies where Henry Schattenkerk in Clean Water looked at how much land was dedicated to stormwater facilities, both on good and bad soils for infiltration. The numbers range from less

than 1% to 15% of the total land needed for storm infrastructure. You would have to combine this with the area needed for roads to benchmark these examples against the current model assumptions. But I’m sure GIS could do that for you on a fairly short turnaround.

Attachment: Case Studies

Following are some projects from the last few years with stormwater facility sizes compared to the overall project area. Average portion of the project area used for storm facilities for those listed below is about 7%.

Except for Dunning Meadows Subdivision and Erickson Farms FA3118, projects with stormwater facilities that were mostly or entirely underground were skipped. Examples of these include Chuck's Market, 139th Street Medical Plaza and Fairground Station. All three have parking lots built over most of the facility. So while the facility is significant in size, the developer can still utilize the surface area for other uses.

Cedar Crest Subdivision
Soils: moderately drained
Public FA3119, wet pond storm facility
ENG2006, construction Aug – Dec 2013
Development area 91,900 sq ft
Stormwater facility area 7,791 sq ft (8.5%)

Erickson Farms Subdivisions
Soils: moderately drained
Public FAs 3001 (Wetpond) & 3118 (filter vault & underground detention)
FA3118 is entirely underground, but is also located on a separate tract of land dedicated as a storm facility
ENG2007, construction June 2012- October 2013
Development area 1,508,000 sq ft (so far two phases to these facilities)
Stormwater facilities total area 67,720 sq ft (4.49%)

The Hampton at Salmon Creek (commercial)
Soils: moderately to well drained.
Private FA3117, filter vault and detention pond.
ENG2012, construction Oct 2012 to Oct 2013.
Development area 116,800
Stormwater facility area 11,555 (9.9%)

Chinook Place Subdivision
Soils: moderately drained
Public FA3116, bioswale & detention pond.
ENG2006, construction July to November 2013.
Development area 203,500 sq ft
Stormwater facility area 11,230 sq ft (5.5%)

Mount Vista Estates Phases 2 – 4 subdivision
Soils: poorly drained.
Public FA2993, bio-swale & detention pond.
ENG2006, construction July to November 2012.
Development area 491,270 sq ft
Stormwater facility area 29,150 sq ft (5.9%)

Mount Vista Estates Phase 1 subdivision
Soils: poorly drained.
Public FA2847, bio-swale & detention pond.
ENG2011, construction Aug to Dec 2011.
Development area 188,100 sq ft
Stormwater facility area 28,000 sq ft (14.8%)

Chase Bank at 63rd St & Andresen Rd (commercial)
Soils: well drained (north half) & poorly drained/wetland (south half)
Private FA2815, filter inlets and detention pond cells.
ENG2010, construction July to Nov 2010.
Development area 67,000 sq ft
Stormwater facility area 5,000 sq ft (7.4%)

----------MORE----------
For comparison. Simply a selection of the latest projects we've added to the inventory regardless of soil type.

Vista Dell Apartments (commercial)
Soils: Poorly Drained
Private FAs 3157, 3158 (infiltration trenches, bio-swales & detention pond, overflow to offsite SWF)
ENG2012, construction July 213 to March 2014
Project area: 237,524 sq ft
Stormwater facility area: 20,228 sq ft (8.5%)

S & R Floor Covering Warehouse (commercial)
Soils: Moderately Well Drained
Private FA3154 (filter strip / detention pond)
ENG2012, construction Jan 2013 to Feb 2014
Approx project site area: 14,000 sq ft
Stormwater facility area: 1792 sq ft (12.8%)

KWRL Bus Facility (commercial)
Soils: poorly drained
Private FA3153 (filter vault / detention pond)
ENG2013, construction Oct 2013 to Feb 2014
Project proposed total disturbed area: 264,000 sq ft
Stormwater facility area 31,163 sq ft (11.8%)

Cascades Presbyterian Church Expansion (commercial)
Soils: excessively drained
Private FA3152 (filter inlet, infiltration trench)
ENG2013, construction July 2013 to Jan 2014
Project proposed disturbed area: 12,500 sq ft
Stormwater facility area: 600 sq ft (4.8%)

Strawberry Hill II subdivision
Soils: moderately drained.
Public FA3134 (filter cartridge structure and infiltration trench bed)
ENG2008, construction July 2013 to Jan 2014.
Project area: 221,000 sq ft
Stormwater Facility area: 5,500 sq ft (2.5%)

Norwegian Hollow subdivision
Soils: excessively drained
Public FA3129 (bio-retention facility)
ENG2013, construction Sept 2013 to Jan 2014
Project area: 648,200 sq ft
Stormwater Facility area: 6474 sq ft (1%)

Dunning Meadows subdivision
Soils: excessively drained
Public FAs 3135 through 3147 (13 FAs, 16 filter inlets & trenches, all in dedicated ROW)
ENG2013, construction July 2013 to Jan 2014.
Project area: 860,000 sq ft
Approx area of stormwater facilities: 7,000 sq ft (0.8%)