Urban Heat Island Webcast
January 29, 2008

Introduction

Eva Wong:
Slide 1

Logistics. Please mute phone line by pushing *6. To unmute *7. For full screen view push F5. We are going to try to use feedback to presenter function. Changing color to purple means you have a question. Presenter will decide when to field questions. The attendee list allows you to see who else is on the call. Those are the main features. I hear some background noise. Please put phones on mute. Now unlocking control of content and handing presentation over to Steve.

Presentations

Eva Wong:
Steve Moddemeyer is the Senior Strategic Advisor with the Seattle dept. of planning and development. Steve is going to provide an overview of Seattle's new landscape requirement for their commercial areas. One other thing to note is that this webcast is being recorded and the PowerPoints will be posted afterwards.

So, Steve go ahead, thank you.

Steve Moddemeyer:

Thanks, I hope everyone can hear me OK. What I'm going to do is talk about Seattle's green factor, which is a landscape ordinance that was adopted in the commercial areas of the city. I'll briefly talk about where it came from and how it's been going since we adopted it, which was about a year ago this month.

Slide 1

The history of the green factor is that, as I understand it, in Berlin, about 10 or so years ago they were looking at watershed planning and trying to figure out a way to recognize the role that urban areas play in watershed function. And so the green factor was developed by a fellow named Carlo Becker, who the city of Berlin has adopted which basically said that if you have new development or redevelopment of a certain size, then it has to replace some of the missing ecological functions through the use of landscape.

Slide 2

Let me just briefly explain why, which is the second slide here. It's probably true everywhere on the planet but certainly in the Pacific Northwest where we are. We were, at least in our habitat, covered with forests, and then of course we removed all that forest,

and the idea is, can we recreate some of that? There are a couple big reasons for that. And one is that, by removing all of that forest, we removed a huge amount of surface area that used to intercept rain.

Interruption, please mute phone lines.

The point was that by removing vegetation we removed a lot of the surface area that used to be in our native landscape. And that surface area was intercepting a lot of rain. And also the plants themselves evaporated a lot because that's how they operate. You know, they evaporate into the air and that's how they pull in nutrients. And, what's happened in Seattle and probably elsewhere is that literally the amount of runoff that we get has exploded tremendously. And this runoff, or storm water runoff, drives all of our costs for all of our sewer improvements, all of our storm water improvements, and all of our natural area restoration activities are almost all dealing with this enhanced amount of runoff. So we're looking at something like more than 30% increase in the actual water we deal with because it used to evaporate back into the air or it used to be absorbed into the ground and then evaporate through the plants.

So, one of the ideas that we're looking at is can we increase the surface area and the green activities and storm water runoff and integrate it with our most dense urban areas.

Slide 3

I'm sure most of the folks on this call know that landscapes and vegetation provides a huge array of benefits. And, in Seattle, up until the green factor we basically thought of landscape as an aesthetic amenity or something to screen out parking, and we would often waive it in particularly dense urban areas like commercial areas. But, now that we look at this list of benefits that come from vegetation – you know absorbs carbon, releases oxygen, helps capture dust, muffle sound, it's habitat, property values increase, people love it, they're actually willing to pay more, it helps buffer the high summer heats by providing shade, and also the active evaporation provides cooling, and so it has an urban heat island effect. It also helps buffer buildings so that they're buffered from both the highs and the lows of summer and winter temperatures. And if you use green roofs or vegetated walls, that can also increase the life of those membranes or building claddings by limiting UV access and expansion and contraction due to heat and freezing temperatures. So, there's a bunch of cool things plants do, so we're saying that plants aren't just an aesthetic amenity, they're part of the environmental function of the city and we want to return them, even in dense urban areas.

Slide 4

One of the ways we do that is really recognizing a bunch of things about it. One thing we did is we took the German system which is identifying landscape strategies then multiply them—give them a factor that you multiply by. One of the things we heard from our folks was that they really valued the landscaping that's done on the street itself. So, when we set up the system we allowed the property owners to count any sort of improvements

they do in the public right away toward meeting their landscape score. The idea being it would be more visible, and also it wouldn't just benefit the building residents but benefit the whole community. So things like visibility help count, as well as lots of alternative versions of what vertical vegetation is, which we're going to hear more about. It provides a lot of the same benefits that a green roof provides, so we really upped the score to encourage people to do that, and it has become one of the most popular ways that people make up their green factor score, because it takes up the smallest amount of footprint of the parcel but provides a lot of green in a narrow footprint so it's been popular as a technique. So, of course we're encouraging it to clime, hang down, and even be on trellises.

Slide 5

The way that it works is that you figure out how much of the landscape is dedicated to various uses. And I know it's hard to see this, but basically if you've got a lawn area we'll give you credit for 2/10ths of a foot, but if you've got vertical green or green roofs then you get the highest score per sq. foot dedicated to those uses.

And one of the key things we've done is encouraged layering of plants, because that's the way that our native systems exist. So, if you have soil that's deep, that counts. If you have a shrub layer that also counts. If you have a tree canopy above that, that also counts. You can start counting multiple scores for the same sq. foot if you've got the layering going on.

Slide 6

So, this is probably a little hard to see. At least it is on my computer. But this is an electronic worksheet. It's basically an Excel spreadsheet that's locked. It's an iterative tool that the designer uses to determine the score of their project. So, they down this sheet from us, then in that top left box they put in the sq. footage of their parcel. And as they're doing their landscape designs they fill in these other boxes. This sheet will automatically give you your score – how you're doing on meeting your green factor. So, this is an Excel spreadsheet, and in a way it becomes a game because you look at your project, then you design it, then you add up the numbers, and then you say, "Oh my gosh, I don't even have the target." And in the commercial areas it's .300, which means roughly 30% of your parcel covered with vegetation. It's not exactly that, but that's kind of roughly what it means. What we found is, and actually one of the engineers in town did a lot of this work…he applied the German biotope area factor, which if you Google you can find the English version on the Berlin website on that biotope area factor…but anyway, he applied that to some of the LEED buildings in Seattle, some of our green buildings. And they were coming in with a score of something like, .15 –15% to 17%. Some of them even less than that. And so, even our green buildings were not even half way there for what we want all buildings in commercial areas to meet. And this is a requirement so they must meet it. But, the way that they meet it is that they go back through and they look for areas that can put vertical greening, which is typically not used.

A lot of people are choosing putting in green roofs. And a lot of people are putting in permeable paving because we also allow credit for paving that infiltrates into the ground.

Slide 7

When you're in the Excel worksheet, which is on the Seattle.gov/dpd/greenfactor (which is the Seattle Department of Planning and Development)—when you go that worksheet, if you hold the curser over the boxes a little definition window pops up and tells you exactly what the definition is for this that fit in it. It's interactive in that way.

Slide 8

Once the designers are done they submit not only the worksheet but they also submit this other sheet which basically identifies each planting area and how the score is being added up. And so our plan reviewers have appreciated that this is fairly easy to review. So they look at the landscape design, and they look at these call-out boxes, and then they compare them on this sheet to see if they really add up to the score that the worksheet predicts. And so they can do a little ground truthing and go, "can you really get two trees in that little spot." Or, if you said 22 trees in that little spot on this particular sketch, they'd go, "Wait a minute, I don't think so." But it's fairly easy to apply. However, if you're the designer there's a learning curve and the first time through a lot of people get pretty frustrated because they know how to do design, and they know how to fill out all the other forms we have, but this is a whole new thing. However, the learning curve is fairly quick, and once people get over it, people get very adept at, in a way, gaming the system—the idea is not to beat it, but how can I meet my clients' needs, and the city's needs for the score, and what's the most cost effective or most exiting way that we can meet the green factor score. So, there's a lot of creativity going into different solutions with every project.

Slide 9

So, this a project that has the kinds of things that we're looking for. On the right hand side you'll see the layering of the vegetation and the ground cover and the tree canopy. We'll give credit for…on the left you'll see a wall with a some vertical greening, and then some more layering. Ideally, inside there'd be permeable paving and things like that and potentially green roofs and things like that added to the project.

Slide 10

So, I've kind of raced through it, but what we're trying to accomplish is to maximize the vegetation potential of these parcels and the right-of-ways. We're trying to reward layering of plant material. We also give credit if you're using drought-tolerant plants, and or rain water harvesting to water those plants. If you have existing trees that you have to preserve or that you want to preserve those count. And we encourage you to plant larger species of trees because that maximizes the canopy cover and the benefits.

We give credit for visibility, meaning anything visible from the right of way gets a little bonus point. And then we let the developers kind of pick their own way to go. There've been some developers who've said, "I hate green roofs, I don't ever want a green roof." And we said, "fine, then, do it without a green roof." But other people, you know, go right to green roofs. But, as I said, what we're seeing is a lot more green roofs, a lot more vertical vegetation, and a lot more permeable paving. And then just a general increase in the thoughtfulness on landscaping. Maybe I should open it up for questions?

Dimitri, Sarasota Cty:
I've been on your website before, it's a great program. Is there a diversity of credits that the applicant can take, or is it one standard form of credit?

Steve Moddemeyer:
What do you mean?

Dimitri, Sarasota Cty:
Well, would they be able to get impact fee reductions, or something of that nature?

Steve Moddemeyer:
No, we ended up just making a requirement. You either meet the green factor score, or you don't get to build your project.

Dimitra, Sarasota Cty:
Then I'd move to where you live.

Steve Moddemeyer:
Right, and it's really inspired a lot of people to meet the score.

Caller:
I imagine it would!

Cathy Deal, EPA R9:
What about the use of native species over exotics?

Steve Moddemeyer:
Well, often natives are in the drought tolerant list but we're not particularly calling out natives because it's such an eclectic urban landscape that we're kind of giving up on that. It's certainly allowable if the developers want to do it, but it's not one of the ways that you jack up your score, unless it's part of your drought tolerant species list.

Jeff King, D.C.:
How does this relate to the green area ratio that I've heard about? Is it basically the same thing, or…?

Steve Moddemeyer:

Yes. We actually started off calling it the green area ratio. "GAR," because we're government officials and we like to put in acronyms. And that didn't inspire us too much. And then we called it the Green Area Factor like they do in Malmo, Sweden. And that was "GAF". And our director said, "You're not going to call this 'GAF'." So, we ended up calling it the Seattle Green Factor. But it's a child of the same progeny.

Jared, Alliance for Community Trees:
Do you know of any kind of ordinance or laws using this?

Steve Moddemeyer:
Well, it's an ordinance here in Seattle, and it's the only one that I know of in the states. But, we are also expanding it. At least we're attempting to into the multi-family zones of the city, which will greatly increase the amount of the city that's covered by this. So, as we go through the zoning of our city, we're adding this in to expand its adoption. And those are all in ordinance and part of the law but I don't know of anyone beyond Seattle, at least so far.

Jared, Alliance for Community Trees:
Where can I go to get a copy of that?

Steve Moddemeyer:
It's on the website that I mentioned – seattle.gov/dpd/greenfactor.

Dimitra:
How does this tie into a fairly recent ordinance that was enacted requiring builders and developers to calculate the GHG emissions of structures that they're going to build?

Steve Moddemeyer:
We haven't quite gotten there on the GHG issue, but what we are doing is evaluating how we would calculate the GHG impacts of various development proposals or zoning strategies, and then we're going to start regulating within the next year or so to find a way to deal with this. Since GHGs are now a pollutant, they fall under our normal pollution laws, and so we feel like we need to start when we're doing CEPA or NEPA (or whatever it's called where you live) – our environmental evaluations are going to have to start including that. The green factor isn't explicitly a carbon strategy. I think it heads in the right direction, but it's not nearly what you would need if you were really going after carbon. So I think there's other work ahead of us.

Cathy, EPA R9:
CA has been working on a CEPA guidance document related to that. And I could probably give you a contact, if you'd like. The name doesn't come to mind at the moment.

Steve Moddemeyer:
We have been looking at CA, but this is just an emerging and extremely important work for all of us.

Ash, CARB:
One of the things that has occurred to us that we're thinking of doing is this idea of climate baselines, or if you like, GHG baselines. You know, just figuring out what's the GHG signature of whatever building you happen to be in. This idea goes part in parcel into those fancy little things called climate calculators. We've all seen multitudes of these things, haven't you? So, my question is, is there any thought in Seattle or elsewhere for coming up with ways of coming up with some kind of a climate signature – just reporting the baseline GHG signature of buildings?

Steve Moddemeyer:
It's still being worked on, and it's still very early, so I would say the answer is no. I'm not saying no because we don't think it's a good idea. I just don't think we've evolved that far yet. But we are looking at a whole bundle of activities that go from how we use conservation, how we look at alternative sources of energy generation—thermal and electric, how we look at zoning and the impacts of the way that people arrive at the buildings as well as the embodied energy of the buildings. So we kind of have it parsed out in a bunch of different ways which are all supportive of the concept but I don't think they're quite rolled up the way you're suggesting.

Ash, CARB:
OK. There's another question that comes to mind. You know that green roofs or white roofs are kind of in something of a competition. So, the question is, if somebody doesn't want to do a green roof but is willing to do a standard roof using cool roof materials, does he get to do that?

Steve Moddemeyer:
Well they can definitely to it. We wouldn't give them any score for meeting their landscaping requirement. But, we would if they were doing a vegetated roof. We also give credit towards meeting your drainage score. You have to meet certain drainage requirements for new buildings, and so, if you're using things that control runoff, like permeable paving or vegetated roof, then those can count towards meeting your requirement that the utility calculates. The cool roof is a good thing, but it's not part of our landscape score.

Ash, CARB:
OK. And, in your tree requirements, do you have a standard select tree type…assessment of tree species that you recommend so that monoterpine and isoprene emitting species are not inadvertently planted?

Steve Moddemeyer:
I was going to say yes until you got to those last two points, which I don't know and answer to. But we do have a list of street trees that approved of various sizes, by species at full growth. The larger the species the higher your score. And then we let the landscape architects or the designers, if they're not in the street right-of-way, they can

select…kind of pick from the list or do an equivalent tree. But I don't think we've used that last criteria—the "iso-something?"

Caller:
You haven't been using biogenic VOC emissions as one of the criteria?

Steve Moddemeyer:
I guess not; I don't know anything about it.

Dimitra, Sarasota Cty:
Correct me if I'm wrong, but I know that there's a website—Select Tree—but that seems to indicate there's an accepted institutionalized standard only for the state of California. Outside of that state the impact of the BVOCs hasn't been kind of universally agreed upon because of climate, wind, other factors.

Ash, CARB:
Actually the emission factors are fairly universal. And, although the SelectTree database is not complete because we haven't yet come up with a tourpine emissions database, but for isoprenes, and isoprenes are critical for generating O_3.

Dimitra, Sarasota Cty:
Yeah, I was just doing a lot of research recently on SIP plants and perhaps the integration and there was a lot of discussion on both sides actually.

Ash, CARB:
Yeah, for most of these…the data that comes for SelectTree is from Benjamen et al. And the databases that have been established are kind of standard. Even NCAR has adopted things like that. NCAR stands for National Center for Atmospheric Research.

Caller:
You are right, however, that the extent to which VOC emissions lead to O_3 concentrations would very much need to be modeled and would depend on meteorology and local conditions. So, you're right that in different areas they'll have different effects.

Ash, CARB:
Oh certainly. In Atlanta, planting a red oak will have a far more significant impact than planting a red oak in Seattle.

Steve Moddemeyer:
That's really interesting news to me, and I'll definitely follow up on this. SelectTree is the name of the website?

David Hitchcock:
I don't know that SIP modeling accounts for actually tree loss that happens in urban areas, which is probably more common than net gains and concern about what species of tree to plant.

Ash, CARB:
That too is an important issue. In fact there are efforts at Sacramento Metro Air Quality Management District and SMOD and others to talk about tree planting as a means of obtaining SIP credits. Although, this ideology has been tested in LA, it has not entirely been accepted in favor either by us or by EPA R9. But it's an idea.

Eva:
This is Eva. I have two questions and one is, Steve, can you give us a sense of how many buildings to date have actually met the requirements? And, how many you're projecting per year? You know, I'm trying to get a sense of implementation. Then, my other question is, what's the biggest obstacle? Do developers say 'this is just going to be too costly and we're not going to do it'? I'm just trying to get an idea of obstacles.

Steve Moddemeyer:
There's somewhere under a hundred buildings that were built in the last year in Seattle, and they haven't all been built because it just went into effect January 20th of 2007. And, that's very early in the Master Use Permitting Phase so a lot of the buildings are just getting constructed now. So, there's less than one hundred. Probably about the same this year…our local economy is pretty strong, but if it tanks that would lower. If we expand, which I'm hopeful we will into multi-family, that'll multiply it by a factor of 5 or 6, I would think. There'll be, I don't know, maybe 300-600 buildings per year within a year or two. But were still just now starting to…we have a couple of grad students who are going to audit the first batch of buildings and see, you know, are they really building what they said they would? How's it look so far? Then we're going to try and do that annually to see how they perform. And there are lots of factors for why performance could be negated. They could maintain it in a way that removes the layering or they could tear out the plants, or there's lots of things that…[interruption]. On the obstacles, I would say that there has been resistance from the development community and in part, one of the ways we're doing it is that we're introducing the green factor as we go through and basically up-zone some of these areas, so we're creating higher density and removing parking restrictions to encourage transit use, and those are both very valuable to the development community. And we're saying, the one thing we want back is enhanced vegetation. So, they might save $1 Million on parking on a building, and we might want $100K back for planting, and they kind of forget the $1 Million and remember the $100K. So we're constantly trying to put it in that context of, "it's a package deal." So, the costs are roughly from 2/10ths to 1% of total building cost.

Eva:
Thank you. Maybe one more question and then maybe we should move on to Anton.

Mark Johnson, Futurity, Chicago:
I'm wondering if you can elaborate on this last slide where it talks about rewards and if that's calculated on top of the green factor, or how that works.

Steve Moddemeyer:

There are categories where you put in your actual amount and then there's some sq footage—for instance if it's visible—any of the sq footage that you get credit for, like on this sketch here that shows the little red car and the tree and the little trees to the right—you've already got green factor credit for those, and all of those get 10% added on top if they're visible from the public right-of-way. There's a couple of these and the other one is drought tolerance of plants and then also rainwater harvesting where they can apply to much of the area, so they're considered like a bonus on top. Because it's not a requirement, it just makes it easier to get to your score if you achieve these bonuses.

Mark Johnson, Futurity, Chicago:
Ok, great. Thank you.

Eva:
Thanks, Steve. Thanks a lot. Everyone, again, PowerPoints will be posted on our website, and this has been recorded, so if someone missed it they can see it again, or hear it again. Thanks again, Steve.

Steve Moddemeyer:
Oh, you're welcome.