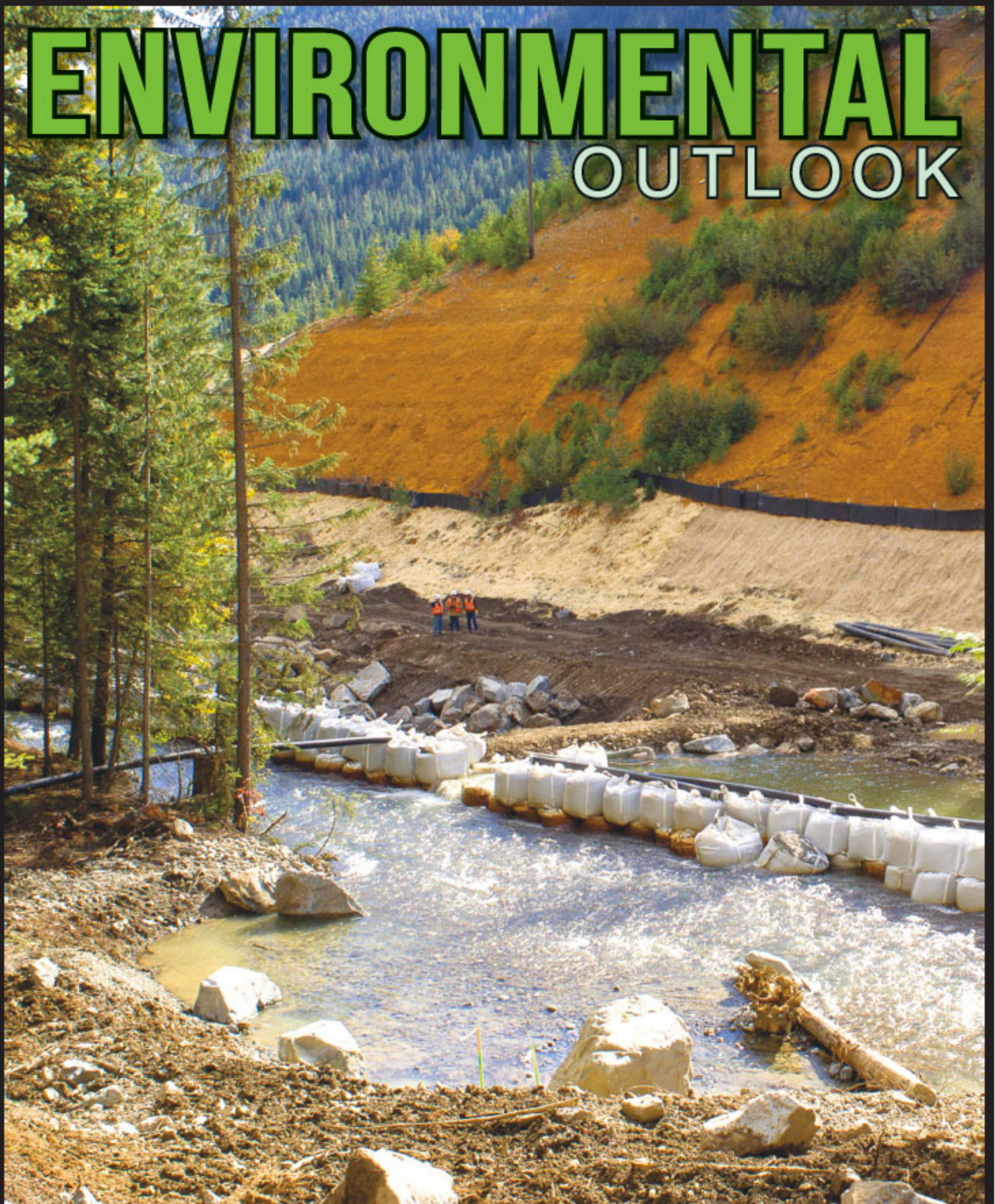


ENVIRONMENTAL OUTLOOK



3 THINGS TO CONSIDER ABOUT YOUR BUILDING MATERIALS

Smart owners and contractors can avoid potential issues by considering the impacts of chemicals found in many building materials.

Over the past several years, the volume and availability of information regarding the composition of building materials, and how exposure to these materials may impact human health, has dramatically increased.



BY NICOLE DENAMUR
PACIFICA LAW GROUP

The design community has considered these risks, including the potential liability associated with obtaining this information and making design recommendations based upon it.

Owners and contractors should also analyze how this new paradigm will impact their business and, at a minimum, consider three aspects: the regulatory landscape, contractual terms and insurance.

Regulatory landscape

Many state and local governments have enacted legislation designed to increase both private and public development of “green” buildings. Some of this legislation has incorporated third-party certification systems as either a mandate or as a basis

for awarding an incentive. For example, in Washington state, pursuant to the High-Performance Public Buildings statute, certain public projects must be “designed, constructed, and certified to at least the LEED silver standard.”

This incorporation of a third-party certification system into the regulatory framework is important because the entities that develop and administer these certifications also are revising their programs to impose requirements and limitations regarding materials toxicity.

In an effort to standardize information, identify human health impacts and summarize the related scientific research, new declarations, disclosures and certification frameworks have been developed.

These new frameworks and labels are sometimes incorporated into existing third-party certification systems, and by default into the regulatory framework. For example, various third-party certification systems and disclosure methodologies related to materials have been incorporated into LEED v4 as pathways to achieve certain credits.

The practical impact of this multi-layered approach is that in order to comply with laws that mandate third-party certification, projects must also comply with

evolving requirements regarding building materials disclosures, and with restrictions on materials that present known or suspected risks to human health.

Contractual terms

Increased awareness regarding, and disclosure of, potentially problematic chemicals in building materials may impact key contractual terms that have remained relatively constant. For example, most standard contracts contain a clause that outlines the parties’ obligations if a “hazardous material” is encountered, used, or installed at the project site.

AIA Document A201 – 2007, a widely used industry contract setting forth the general conditions under which a project will be built, specifically notes that asbestos and polychlorinated biphenyls (PCB) are “hazardous substances.”

PCBs were used in a variety of construction materials until they were banned in the late 1970s.

The Associated General Contractors’ ConsensusDocs 200, another popular contract used in construction, ambiguously defines a “hazardous material” as “any substance or material identified now or in the future as hazardous under any federal, state or local law or regulation.”

This broad language is important because third-party certification systems often characterize materials and chemicals to be avoided with phrases that are very close in meaning to hazardous, including “banned,” “serious risk to human health” or “toxic.”

In light of the increasing number of scientific studies analyzing the long-term, and sometimes permanent impacts to human health and the environment of chemicals commonly found in many building materials — including lead, mercury, added formaldehyde, polyvinyl chloride and brominated flame retardants — what constitutes a hazardous material is arguably a moving

legal target.

Categorization of these substances as hazardous or toxic (either directly in legislation or indirectly through third-party systems) could create a number of legal issues. This is particularly true as the Toxic Substances Control Act, untouched for 40 years, was recently revised to improve the federal government’s ability to regulate chemicals.

To address these issues on the design side, the American Institute of Architects developed contract language that parties could consider incorporating into agreements governing projects where owners request information regarding, or pursue goals related to, “healthier” materials. See AIA Document B503 – 2007, Guide for Amendments to AIA Owner-Architect Agreements, Section 20.

Among other things, the proposed language clarifies the architect’s role relevant to disclosures, and that impacts to human health should be addressed by a toxicologist or other, similarly trained professional. Efforts to address these issues from the design side should be mirrored on the development and construction side.

Insurance

Industry professionals will also want to analyze potential insurance coverage issues.

For example, consider the implications of a regulatory entity (and/or third party certification system that has been incorporated into law) enacting legislation that directly or indirectly deems a material “hazardous” or “banned” after a significant amount has been installed within a project. This could trigger a variety of insurance issues, including (1) whether these materials, once incorporated into the project, constitute covered “property damage” and (2) if claims will be excluded under either broad pollution exclusions or newly created exclusions specific to problematic materials.

Historically, the insurance industry has responded to an influx of claims by creating specific exclusions, such as those developed for asbestos and lead in the 1970s and 1980s.

We could see a similar response to other potentially problematic building materials. Smart owners and contractors will want to avoid potential claims and coverage litigation by taking a leadership role with regard to chemicals of concern.

Best practices

Materials toxicity and the built environment’s impact on human health will be an increasingly significant consideration for owners, designers and builders. A few tips can help project teams prepare to work in this evolving landscape, and build a future where the built environment does less harm to the health of its occupants:

- Educate team members about materials toxicity and disclosures.
- When necessary, retain experts on materials toxicity and impacts to human health.
- Be aware of regulatory changes that may impact standard contract language.
- Analyze how changes to third-party certification systems may impact the regulatory landscape.
- Consider revising form contracts to address issues related to materials. Use the language proposed by industry experts as a starting point.
- Communicate with your insurance broker when projects involve materials-specific goals.
- Support manufacturers that commit to an open and transparent supply chain.

Nicole DeNamur is a lawyer at Pacifica Law Group, a LEED Green Associate and WELL AP, and an affiliate instructor at the University of Washington’s Runstad Center for Real Estate Studies.

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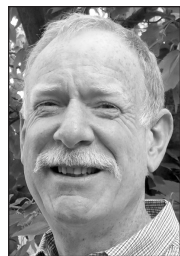
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NAVIGATING WASHINGTON'S WATER RIGHTS PROCESS

Obtaining a water right has gotten difficult due to environmental awareness, court cases and federal laws.

If you have a physical project, you most likely need water. If you are in the service area of a water purveyor, this is a simple process of getting a water availability certificate, paying a connection fee and paying a regular water bill.



BY CHRIS PITRE
COHO WATER
RESOURCES

If you are outside of such service areas, you may get a water right.

This article briefly describes the outcome of recent water

lawsuits, options for getting water, and finally, the water right permitting process.

Recent lawsuits

Obtaining a water right has gotten very difficult due to environmental awareness, court cases and federal laws like the Endangered Species Act. Two court cases in 2013 and 2015 have severely limited the discretion of the Washington Department of Ecology to find solutions and the availability of water for out-of-stream uses.

In both cases, Ecology tried to use regulatory allowances that allowed discretion if the decisions were determined to be in the "over-riding consideration of the public interest" (OCPI). In both cases, the Supreme Court

determined that Ecology overstepped its authority, made the OCPI standard unattainable, and ended discretion Ecology may have had in applying the law. The implications of these two decisions are discussed in the following sections.

● **Loss of exemption for small wells.** The 2013 Supreme Court decision eliminated an exemption from the water right permitting process for small groundwater wells in most of Skagit County because of potential impacts on streamflows. Rural housing development depends on getting water through exempt wells and the court decision has made it very difficult to get a water availability certificate, causing an effective building moratorium.

The exemption has also been eliminated in portions of Kittitas, Clallam, Nooksack and other counties. More information is here: <http://tinyurl.com/Ecology-exemption>.

● **No alternative mitigation allowed for new water rights.** Getting a new water right typically requires mitigation of impacts such as reduced streamflows. This has historically been interpreted as being drop-for-drop or in-kind/place/time, meaning if groundwater pumping causes a reduction of streamflow, that streamflow must be replaced in the place and time the reduction occurs.

State policy has recently con-



Coho changed water rights for Sundale Orchards in Eastern Washington, allowing it to expand its irrigated acreage by 40 percent.

PHOTO COURTESY OF COHO WATER RESOURCES

sidered other forms of mitigation called out-of-kind/time/place that could provide more stream benefits, such as conservation easements.

A water right was issued to

the city of Yelm in 2011 using a complex mitigation package with out-of-kind type mitigations. However, the 2015 Supreme Court decision allowed only in-kind type mitigation and can-

celed Yelm's water right. This has reverted all mitigation options to be of the in-kind type.

These restrictions have made

WATER RIGHTS — PAGE 8



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INSIDE

- 2 3 things to consider about your building materials
- 3 Navigating Washington's water rights process
- 4 Reusing stormwater can release untapped benefits
- 5 Restoring an ecosystem? Get to know your geotech
- 6 New water plant saves Lynden from the 'milkshake effect'
- 9 With Passive House, incentives are all carrot and no stick
- 10 Brownfields are becoming developers' next frontier
- 12 Still much to learn about the carbon story of buildings
- 12 Robots go where no divers can to recover munitions
- 13 2016 Environmental Outlook Surveys

ON THE COVER

Hart Crowser is consulting with the Forest Service on the Holden Mine cleanup near Lake Chelan. Turn to page 13 to find out what Hart Crowser and other environmental firms are up to.

PHOTO BY MARK DAGEL/HART CROWSER

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REUSING STORMWATER CAN RELEASE UNTAPPED BENEFITS

The infrastructure needed to move and clean water for city use can consume more energy than localized water collection and reuse.

The focus of green stormwater infrastructure (GSI) is to mitigate the downstream effects of stormwater runoff in the urban environment. It does this by mimicking effective natural systems — soils, ground plane, etc. — to absorb, delay and clean the water within a natural watershed before it reaches a collecting body of water.



BY RACHAEL MEYER
WEBER THOMPSON

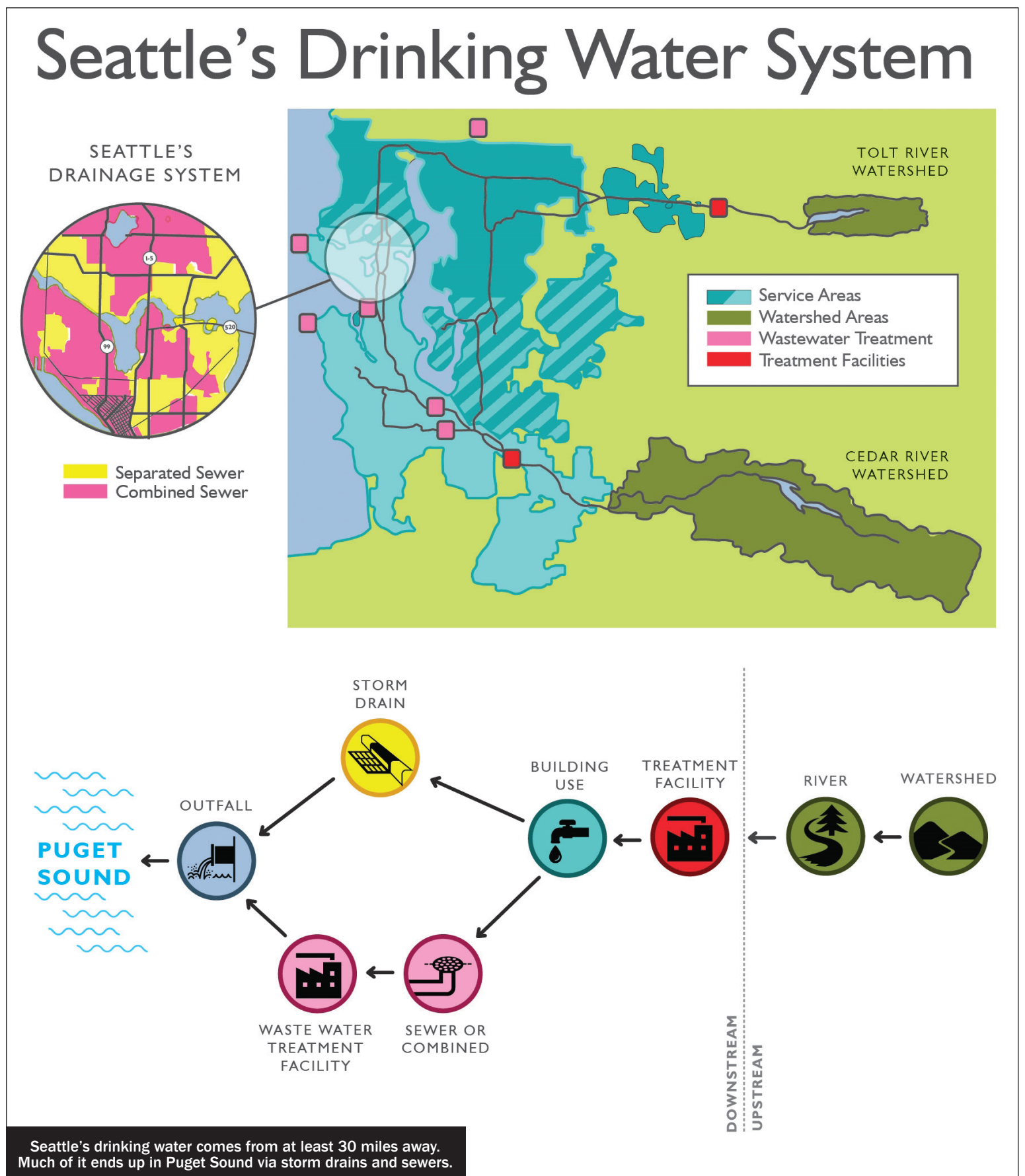
However, GSI strategies have the potential to improve stormwater's environmental impact upstream as well through lower water usage. This is usually achieved through low-flow plumbing fixtures, or efficient irrigation systems.

But, imagine if each water fixture had a label showing how far the water came from and where it goes after it is used. If you knew how far the water you used traveled, and the cleaning effort involved to reach a potable level, would it influence how much water you use?

Seattle's drinking water, collected in the Cascade Mountains from the Tolt and Cedar rivers, is sent through drinking water treatment facilities, and then routed to the city in water distribution systems. This means the water we drink is collected 30-40 miles away. Research has shown that the infrastructure needed to move and clean water for city use can actually have a higher overall embodied energy than localized water collection and reuse at the building scale.

After water is used, it typically travels through a wastewater treatment facility before it goes to the collecting water body, in Seattle's case, the Puget Sound. Wastewater treatment is an energy-intensive process, which is unnecessarily overloaded where stormwater and sewer infrastructure are combined, as they are in many areas of Seattle.

Based on research from Urban Greenprint, a local research and advocacy effort developing place-based design guidelines to improve Seattle's ecological health, evaporation serves a major function in the Northwest's ecological water cycle. Unfortunately, the reduction of our forests, which dominated Seattle's predevelopment landscape, has caused the natural water cycle to change. Predevelopment, approximately 49.8 percent of rainfall evaporated from a forested landscape, 50 percent infiltrated into the soil and 0.2 percent was



GRAPHIC COURTESY WEBER THOMPSON LANDSCAPE

surface runoff.

As a GSI strategy, evaporation has not received much focus, however the ultimate function of evaporation is to remove water from the system, preventing it from runoff or infiltration. Stormwater reuse, through small-scale collection and cisterns at the building

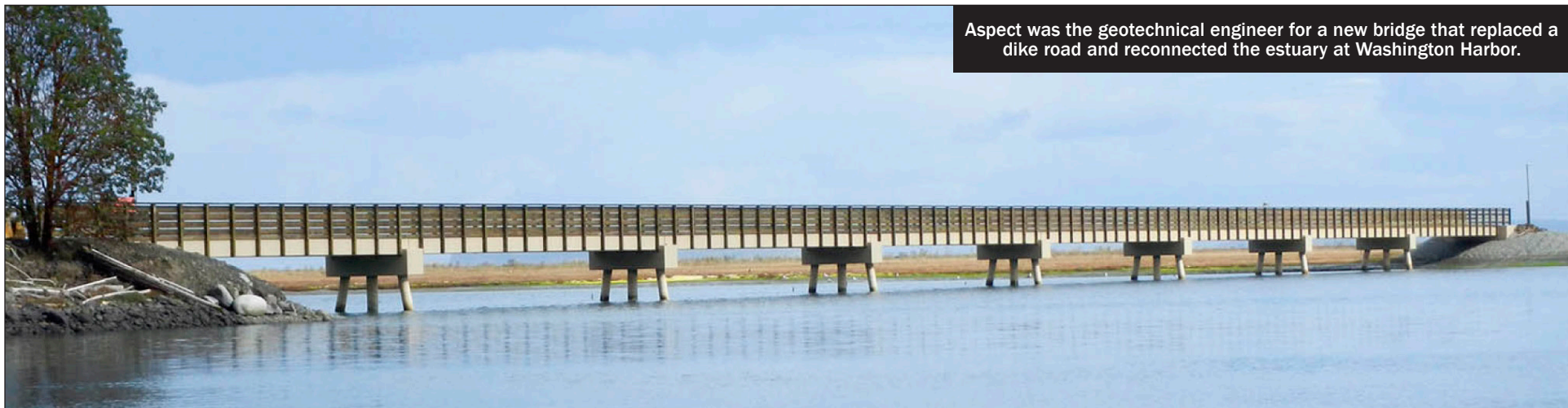
scale, is a strategy that can begin to mimic evaporation by removing stormwater from the natural water cycle. This reuse of non-potable water from onsite collection greatly reduces the effort, energy and carbon expended by our potable water infrastructure.

Ideally, we would primarily

reuse stormwater that has fallen on a site for all non-potable building water. This would prevent the most amount of water from going through any water treatment facility unnecessarily. In addition to reuse, any measures that prevent water from leaving a site, i.e. evaporation, should also be explored.

Combined, these strategies will help restore the function of the ecological water cycle.

Rachael Meyer, PLA, GRP, LEED AP, is principal of Landscape Architecture at Weber Thompson working on residential, commercial office and mixed-use landscape designs.



Aspect was the geotechnical engineer for a new bridge that replaced a dike road and reconnected the estuary at Washington Harbor.

PHOTO FROM ASPECT CONSULTING

RESTORING AN ECOSYSTEM? GET TO KNOW YOUR GEOTECH

Geotechnical engineers can help ecosystem restoration projects move faster and be more cost-efficient.

A key goal of ecosystem restoration projects along Pacific Northwest waterways is to improve passage and habitat for salmon and other fish species.

Creating a healthier home for fish requires a multidisciplinary approach that addresses not just biological and ecological concerns, but also removing or replacing physical barriers blocking fishes' path — be it an aging bridge, an undersized culvert, a road embankment impeding natural tidal influences, or a large quantity of earth disconnecting a floodplain.



BY ANDREW HOLMSON
ASPECT CONSULTING

Enter the geotechnical engineer.

While it may not always be apparent, geotechnical engineers are integral to restoration projects. Because their work is typically done far ahead of actual construction, it's easy to boil down their role to drilling some holes, looking at the soil, and saying "build it this way."

But a geotech's work is much more and represents the basis for many elements of the larger project. By pursuing a proactive, collaborative mindset at project kickoff and integrating their work with those of other disciplines, geotechnical engineers can help projects move faster, be better informed and be more cost-efficient.

Know the goals

Early, holistic involvement by the geotechnical engineer to better understand project goals is important and often overlooked. It starts with a discussion with the owner and asking focused questions to gauge the project's

bigger picture. Is the project strictly for habitat restoration? Is it to increase flood storage? Are there transportation or recreational elements to consider? What are the civil and utility needs? Who are the stakeholders outside of the owners?

Take asking about the funding source, which often defines the design criteria. For example, if the Federal Highway Administration funds a project, some elements may be subject to strict seismic standards, which can be costly. If levees are involved and it is desired to certify them with Federal Emergency Management Agency criteria, they must be designed to a certain standard.

Asking these types of questions and knowing the owner's answers can help geotechnical engineers know the project's priorities and where they may be able to help other members of the design team.

Know the players

The next step is knowing who else will be working to achieve the project's goals and which stakeholders may be affected by its outcome. Teams can be large and diverse. Communication between disciplines is often crucial to success.

Know the practice

Since their work is an important baseline for restoration projects, geotechnical engineers are often one of the first disciplines to break ground as they set out to collect information on the soil. Drilling borings, excavating test pits, conducting geophysical studies, or good old-fashioned shovel pits — these explorations help characterize the subsurface conditions that the team will use as the foundation for the rest of the project.

With a comprehensive understanding of the project and its

players, geotechnical engineers can seek opportunities to execute an exploration program that benefits all aspects of the project.

Some ways geotechs can collaborate with other team members are:

- **Collaborate early to understand the subsurface.** Geotechs and archaeologists typically conduct subsurface investigations

early. The archaeologists tend to explore many locations at shallow depths, whereas geotechs are more targeted but explore deeper into the ground.

If the geotech can coordinate to be on-site when the archaeologists are conducting their explorations and vice versa, each can see the conditions firsthand and document them for their respective purposes. Such cooperation creates a richer data set and

better overall understanding of the subsurface conditions.

- **Strategic siting to explore soil reuse and grain size.** Restoration projects often have a habitat excavation area specifically for reconnecting the floodplain to the mainstem river or creek by creating a stream channel, pond, or a low area for a wetland.

GEOTECH — PAGE 7



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NEW WATER PLANT SAVES LYNDEN FROM THE 'MILKSHAKE EFFECT'

The facility can treat 8 million gallons of water daily; triple what the old plant could do.

Most people love a good chocolate milkshake.

But they don't want that milkshake coming out of their tap at home. They want clean, clear water.

That scenario is similar to what the city of Lynden was facing just a few years ago. A dinosaur of a water treatment plant, coupled with on ongoing drought, had the community and its 13,000 residents facing an uncertain water future.



BY MILES YI
STANTEC

A decade in planning, a new \$28 million water treatment plant has been turning out clean water for the northwest Washington community for the past year. The water treatment plant was named the 2016 Environmental Project of the Year by the Washington Chapter of the American Public Works Association.

But it was no easy task getting the plant into operation.

'The milkshake effect'

Along with much of Washington, Lynden has suffered through the recent drought years. The city's main source of water, the Nooksack River, was reported in June 2015 to be at its lowest

point since records were first kept in 1966.

The drought and associated low flow in the river leads to the "chocolate milkshake effect" — high water turbidity.

Turbidity is essentially a measure of the amount of solids in the water.

The Nooksack River's raw water turbidity frequently varies from 60 to 1,500 NTU, a unit used to measure solids in the water. U.S. laws require that public water treatment systems have water at 1 NTU.

A water treatment plant's job it to take that "thick" water and turn it into drinking water. And it was simply too much for the city's existing water treatment plant to handle. The 90-year-old plant had serious defects and could not meet peak day demands, forcing the city to rely on storage. Extended peak demand would exhaust the storage capacity, resulting in service disruptions for area homes and businesses. The reliability of the city's water supply and health of the community depended on the new plant.

The city partnered with Stantec to design a new plant than can treat 8 million gallons of water per day, tripling the volume from the previous facility. Planning for future community growth in Whatcom County, the plant was designed to be easily expandable to treat up to 12 million gallons daily.



The new \$28 million Lynden Water Treatment Plant opened in September 2015.

PHOTOS COURTESY OF STANTEC

Kind to the environment

The design team and community leaders had a goal of increasing water availability while limiting the environmental impact of the new plant.

The new plant uses all the economically available technologies in three major areas: energy efficiency, treatment efficiency and construction efficiency.

Energy efficiency design includes:

- Water treatment is a fully automatic process. Building and electrical controls require little operator attention while achieving optimization in energy consumption. The plant exceeds state energy code recommendations.
- Maximized use of natural light and fully automatic lighting control for energy conservation.

- LED lighting, which extends lamp life to 100,000 hours and reduces energy consumption.

Water treatment efficiency design considerations include:

- Multi-tray gravity flow vortex grit removal for the source water from the Nooksack River. The grit can reach up to 10 cubic yards per day during high-turbidity times.
- Reduction in the use of water treatment chemicals, ultraviolet for primary disinfection for giardia and cryptosporidium, and on-site sodium hypochlorite generation.
- Hydraulic gravity flow throughout the plant.

Construction efficiencies include:

- At 19,000 square feet, the building is compact for its pur-

pose, limiting construction materials.

• A bio-filtration swale was built to the south end of the construction site to treat stormwater, surface runoff and construction dewatering to protect the Nooksack River.

• Auger-cast concrete piles were used for foundation support to overcome the poor soil condition, high ground water table and potential risk of soil liquefaction from a major earthquake.

The plant is designed to last decades and environmentally sensitive decisions will multiply in benefits as the years progress.

Financial footprint

The old water treatment plant certainly stood the test of time. After 90 years, Lynden needed a

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20
YEARS



The plant has some of the latest technologies to improve water quality, such as these flocculation basins that help reduce solids in the water.

new facility. But the city couldn't tackle the full financial burden. And it certainly didn't want to hand its taxpayers a multi-million dollar tab either.

So the city, with Stantec's support, partnered with a variety of federal, state and regional government and funding agencies. Funding sources included Washington's Drinking Water State Revolving Fund, Public Works Board Trust Fund loan, Whatcom County Economic Development Incentive Program loan and grant, and internal funds.

To stretch those funding dollars as far as possible, the project was put out to bid in the spring of 2013. Sometimes, when a project is bid is critical to its financial success. That was the case with the Lynden plant.

The decision and timing to bid were based on the construction market conditions in early 2013 that were generally favorable to Lynden due to low material prices

and construction demand. There were nine conforming bids, and the closing bid was almost \$2 million below the engineer's estimate.

By September 2015, this complex water treatment plant was completed on time and on budget.

What it means

"This is a very special moment in time for me, and I expect that my grandchildren will appreciate this facility long after me," Lynden Mayor Scott Korhuis said at the plant dedication.

Water is essential for life. And, truly, it is essential for community growth and development. Lynden has traded the possibility of "chocolate milkshakes" for healthy, clear water.

Miles Yi is a senior associate and process engineer for Stantec who worked extensively on the Lynden Water Treatment Plant.



The new plant, shown here under construction, has a 6 million-gallon water reservoir.

GEOTECH

CONTINUED FROM PAGE 5

By placing their explorations within these areas, geotechs can help characterize potential on-site borrow sources. This information lets construction crews know if they can reuse the soil they excavate as fill for levees or other project features.

The volume of earthwork on restoration projects can be significant, especially on larger projects such as levee setbacks or removals, and therefore costly. If borrow material comes from on-site, the material costs will be far less, resulting in significant savings. Knowing early on if the on-site borrow can be reused provides the most benefit to the project.

Explorations and sampling can also be adjusted to help gather information for geomorphologic analyses. For example, geotechs can plan to sample and analyze for sediment grain size from areas inside the proposed habitat excavation area.

Geomorphologists can use the results to help predict how the river or creek will flow and how that movement will affect the soil over time. The grain size also plays into the design of scour mitigation solutions, like riprap or engineered log jams.

Scour mitigation can help "train" the river to keep it from meandering into an undesired area or protect structure foundations like bridge abutments from scour.

● **Add groundwater monitoring to learn how to cool the river.** Select explorations can be finished with groundwater monitoring elements to characterize the hyporheic zone and inform side channel planning and recharge/up-welling estimates.

The hyporheic zone is the shallow groundwater zone near the ground surface that feeds streams/creeks/streams with groundwater — it is important because it typically provides significant return flows to the streams that are usually cooler/cleaner (when compared to surface flows) and often a major benefit to fish habitat and conditions.

Geotechs can share their groundwater monitoring data with the biologists, hydrogeologists and geomorphologists who will use it to inform their recommendations on where best to locate a side channel, how it should be designed, and how it will move/scour and interact with other restoration features.

These examples illustrate considerations that are often outside of a typical geotechnical scope of work, which is usually limited to explorations and applied to specific structures like a levee, culvert or bridge. But adding these elements results in a more comprehensive and cohesive project design and construction.

Ultimately, the success of the overall project is dependent on the success of the individual task — just like the health of the ecosystem that geotechs are working to help restore.

Andrew Holmson, PE, is a senior geotechnical engineer at Aspect Consulting with 10 years of experience. He is lead geotechnical engineer on all of Aspect's culvert/bridge replacement and levee modification/estuary restoration projects in the west Puget Sound area.



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WATER RIGHTS

CONTINUED FROM PAGE 3

obtaining a new water right ever more difficult. More information is here: <http://tinyurl.com/Ecology-water>.

How to get water now

Water banks. Water banks owned and operated by public, private or not-for-profit entities have developed in some parts of the state to serve rural development needs. Water banks acquire water rights and take care of the administrative processes of transferring portions to new owners.

A water bank usually only serves a well-defined geographic area that can be very limited. Therefore, banks are not the solution for all needs. After obtaining a water right through a bank, the applicant must still develop a source by installing their own groundwater well.

More information is here: <http://tinyurl.com/Ecology-waterbank>

Acquiring an existing right. If there is no water bank or you wish to avoid the costs of a water bill, you could acquire a water right — if one is available. A right

might be found by searching the state-wide database, purchasing a property-associated water right, or hiring a well-connected agent to find one for you.

Water rights are usually attached to the land, so getting the land also gets you the water right. However, an application is needed to change the place, purpose and/or period of use of the water right — or if you wish to acquire the water right from the owner without buying the land.

Changes are best processed through county water conservancy boards, of which there are now 17, or through Ecology's cost reimbursement program.

Before making any commitment to acquiring a water right, a complete audit should be conducted to ensure you are buying a valid water right and that you can use it in the way you wish.

Obtaining a new water right. Getting a new water right has been increasingly difficult, and recent court decisions have made it ever more difficult. It is generally a long shot, but there are special circumstances in which a new water right might be obtainable. One example is

where a groundwater withdrawal affects only marine waters, not streams.

Processing applications

Applications submitted to Ecology for routine processing are unlikely to be processed in a timely manner, with some taking more than a decade. However, exceptions and alternative pathways have been created, which are discussed below. Ecology encourages applicants to conduct a pre-application meeting to ensure the applicant understands the processes involved before they incur significant costs.

Priority processing. Applications meeting the criteria for priority processing by Ecology include: a public health emergency or providing significant environmental benefit; and having no adverse impacts on other water users or the environment. The bar for meeting these criteria is very high, and unlikely to be met for typical projects.

Water conservancy boards. Boards have been set up by

counties to process change applications (not applications for new rights). It is strongly advised that applicants retain a consultant to assist the board in processing the applications by preparing analysis, drafting decisions for their consideration, and moving the application through the process.

Cost reimbursement agreement. A CRA is the only reasonable option if there is no board in your project area to change a right, or if you are applying for a new right. In a CRA, Ecology hires a consultant to process the application, and the applicant reimburses Ecology. The applicant typically also retains their own consultant for advice and guidance, thereby ending up paying for two consultants.

Streamlined CRA process. The streamlined CRA process allows an applicant to hire a consultant directly, instead of Ecology. This reduces costs by paying one consultant instead of two. The applicant must first obtain Ecology's approval of a qualified consultant.

Safeguarding your rights

The ever-increasing constraints on water rights highlight their value. Holders of existing water rights should fully understand and protect their water right assets by getting an internal audit done. For example, any portion of a water right can be lost if it is not used for five years, and provisions are written into many water rights that must be met to maintain their rights in good standing.

The information presented in this article is greatly simplified and the direction for each project is dependent upon the specifics. Water right processes are becoming so complex that obtaining professional help is advised in all cases.

Chris Pitre is founder and principal of Seattle-based Coho Water Resources, which specializes in water rights, groundwater development and integrated water resource management. He is a licensed geologist and hydrogeologist, and a Certified Water Rights Examiner in Washington.

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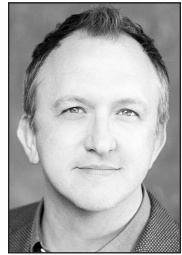
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WITH PASSIVE HOUSE, INCENTIVES ARE ALL CARROT AND NO STICK

The genius of the Passive House approach is that it views the building itself – its skeleton and skin – as a technology.

When I bought my Prius in 2010, the federal tax rebate for hybrid vehicles was a real win-win. The feds got one step closer to their fuel efficiency goals and I got my hands on an uber-efficient vehicle without breaking the bank.



BY ZACK SEMKE
NK ARCHITECTS

The approach was simple: incentivize the purchase of a superior-performing product. But imagine if that incentive had been structured differently. What if it depended on user behavior? What if I could be penalized later if my driving habits led to greater-than-modeled fuel use? Too many trips to the mountains? Foot too heavy on the gas pedal?

With the risk of such a penalty, I wouldn't have purchased the Prius. I doubt others would have either. The risk of that behavior-based penalty would have weakened the incentive's power to motivate buyers to purchase

hybrids, slowing adoption.

The certainty of Prius performance means that policymakers don't have to impose such a penalty. The fuel efficiency of a 2016 Prius is carefully measured and known (VW cheating notwithstanding), and each Prius that comes off the assembly line will perform essentially identically to the one before it. Regardless of driver behavior, more Priuses means increased fuel economy on aggregate.

But that kind of certainty has been lacking for green buildings. Unlike cars, every custom-designed building is a prototype, totally unique. Even for designs that are replicated over and over, each building will vary in orientation, shading, solar access, elevation and construction quality. And frankly, conventional means of predicting building energy performance, even LEED-certified ones, has seemed little better than guesswork at times.

The rational decision for policymakers crafting building efficiency incentives has been to require post-occupancy energy monitoring and to impose penalties when actual performance

Orchards at Orenco, near Portland, applied lessons learned from phase one to slash the Passive House expense in phase two by more than half. Ankrom Moisan and Walsh Construction led the team.



PHOTO BY CASEY BRAUNGER

doesn't perform up to snuff.

While this approach removes uncertainty for policymakers, it creates it for project owners. The risk of financial penalty is a disincentive.

Passive House design can remove uncertainty for both policymakers and project owners. Its energy modeling is predictive, with modeled results highly corre-

lated with actual energy use. This correlation is thoroughly documented and demonstrated thousands of times over in the U.S., Europe, China and elsewhere.

This certainty means that, like the Prius incentive, we can incentivize better buildings with all carrot and no stick because both policymakers and project owners know that they'll get

superior energy performance at project completion.

Driving costs down

Make no mistake, the stakes are high for getting catalysts for change right.

Most of us recognize that

PASSIVE HOUSE — PAGE 13

Is your organization prepared for the proposed new Washington State solid waste handling regulations?

The Washington State Department of Ecology is in the process of revising the "350" Rule for managing solid waste (Chapter 173-350 of the Washington Administration Code)—*the most significant revisions since the rule was adopted in 2003*. Sections 235 and 995 were added in the preliminary draft rule and propose to regulate impacted soil and sediment.

WHO'S AFFECTED? Anyone involved in the import to or export of soil from a property.

WHAT'S NEW IN THE PRELIMINARY DRAFT RULE FOR EARTHWORK PROJECTS? The new rule proposes regulation of soil and sediment with concentrations greater than natural background levels (i.e., "impacted soil") as a solid waste.

IMPORTANT DATES: The comment period for the preliminary draft rule revisions closed September 6, 2016. Ecology anticipates that the formal proposed rule revisions will be filed and released for public comment in late 2016, although the Ecology website currently lists the date as "to be determined." The date for adoption of the revised 350 Rule is also listed as TBD, but we understand that Ecology targets mid-2017.

LEARN MORE. We're involved in closely tracking and commenting on the proposed changes. There are a number of questions our clients are asking that need answers, such as:

- How would the rule revision affect my development projects' cost and schedule?
- Will accepting impacted soil affect whether a property can be redeveloped?
- Which agency will approve results of soil testing identified in sections 235 and 995?
- Who is liable if impacted soil is imported to a property and fines, permitting requirements, and/or soil removal are incurred?
- What records will be required and how long must they be retained?
- Is due diligence really a protection from penalties?
- How will requirements of sections 235 and 995 affect real estate sales and purchases?
- Will solid waste screening levels become the new standard for determining "how clean is clean?"

Please contact us to discuss how the proposed rule revisions could affect your property or projects, or for assistance in commenting during the rule revision process. For additional insight visit www.landauinc.com/news/solid-waste. The proposed new rule text and supporting documents are available for review at Ecology's website: www.ecy.wa.gov/programs/swfa/rules/wac173350/1308ov.html



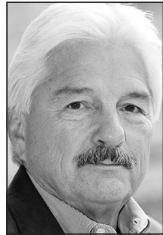
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BROWNFIELDS ARE BECOMING DEVELOPERS' NEXT FRONTIER

In the last two years, the Department of Ecology has seen a 50 percent increase in the number of contaminated sites being reported and increased applications into the Voluntary Cleanup Program.



BY MICHAEL STRINGER



JIM DARLING

MAUL FOSTER & ALONGI



More businesses like Alcobra Metals are being sought to help redevelop Hillyard in Spokane.

PHOTO FROM MAUL FOSTER & ALONGI

A row of empty mill buildings along a quiet river bank lined with old pilings. A sunbaked empty lot along a railroad track bordered by a chain link fence with the foundation of a former manufacturing plant barely visible beneath the weeds. These sites are symbols of the natural resource extraction economy's decline.

Communities across Washington state are increasingly looking

at vacant and shuttered former industrial sites as opportunities to spark revitalization.

From closed lumber mills in Aberdeen to a former rail yard in Spokane, local governments are following the examples of Tacoma's Thea Foss Waterway and Bellingham's Waterfront District by taking a leadership role in cleanup and redevelopment of

brownfield properties. Through a combination of market forces, land-use planning and public-private partnerships, some of Washington's most challenged properties are now becoming catalysts for redevelopment.

Redevelopment is the cure

Brownfield properties often sit

vacant for years until a compelling future use is found that attracts financing and motivates parties to go through the cleanup process. With the real estate cycle's current upswing, redevelopment is becoming the remedy to re-energize contaminated properties. As market demand continues to drive urban infill development, easier properties

have been redeveloped and the next tier of more complex properties with legacy environmental impacts are now being addressed.

In the last two years, Washington's Department of Ecology has seen a 50 percent increase in the number of contaminated sites being reported and increased applications into the

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In the hottest markets, like Seattle's South Lake Union, the higher value of real estate can often bear the costs of environmental remediation. But in secondary markets, public sector investments are typically needed to mitigate clean-up costs and make redevelopment financially feasible. The costs and risks of environmental cleanup are often too large for the private sector to bear, and local governments are stepping in to significantly improve financial feasibility for projects.

Communities can capitalize on multiple state and federal funding and policy tools to achieve their economic goals. Examples from the east and west ends of the state show how local governments are strategically planning to position brownfield properties for adaptive re-use.

Hillyard

The Hillyard neighborhood in northeast Spokane was once the home of the Great Northern rail yard.

Developed by JJ Hill and known as "Hill's Yard," the rail yard once manufactured the country's largest locomotive engines.

When the rail yard closed in the 1980s, the community lost hundreds of jobs. The surrounding area of approximately 500 acres of industrial-zoned property has slowly become the workbench of Spokane, housing dozens of small businesses including contractors, auto repair shops, fabricators, and food processors and distributors.

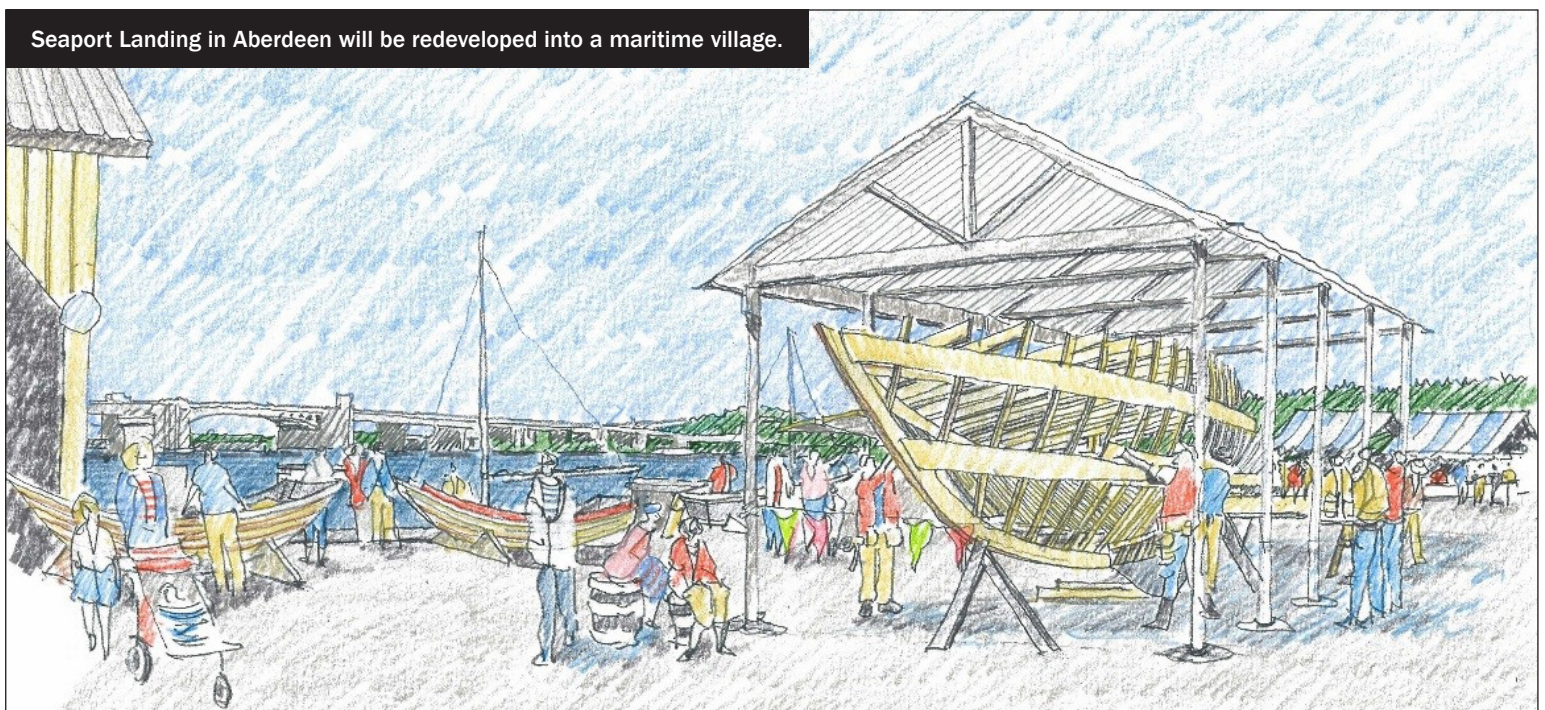
The long-awaited North Spokane Highway Corridor has reached the edge of the Hillyard industrial area, and with passage of the state Legislature's latest transportation package, funding is in place to connect the highway to Interstate 90 and dramatically improve access and freight mobility to Hillyard.

The city of Spokane has established the Northeast Public Development Authority (NEPDA) to energize efforts to leverage this large infrastructure investment to create more jobs in this employment center. Real and perceived environmental contamination issues remain a challenge and need to be addressed to capitalize on this opportunity.

"The city is targeting our public resources to catalyze redevelopment in Hillyard," says Teri Stripes, city of Spokane planner. "Through reaching out to private-sector partners and collaborating with the NEPDA, we have learned our most effective role is to get the right public infrastructure in place, package together financial incentives, and capitalize on state and federal resources to resolve environmental issues."

The city has established Washington's first Redevelopment Opportunity Zone. This new designation offers unique environmental risk-management tools and also prioritizes cleanup grant funding.

The city has obtained grants



Seaport Landing in Aberdeen will be redeveloped into a maritime village.

IMAGE FROM SRG ARCHITECTS

from the U.S. Environmental Protection Agency and state Department of Commerce to support these efforts.

Maul Foster & Alongi has teamed with EcoNorthwest and Heartland LLC to conduct a market assessment, evaluate financial feasibility of redevelopment projects, inventory potential brownfield properties, plan infrastructure improvements and develop strategies to promote revitalization.

These strategies will position the city to address critical concerns and attract private investment, enabling the Hillyard area to live up to its full potential as an employment center.

Seaport Landing

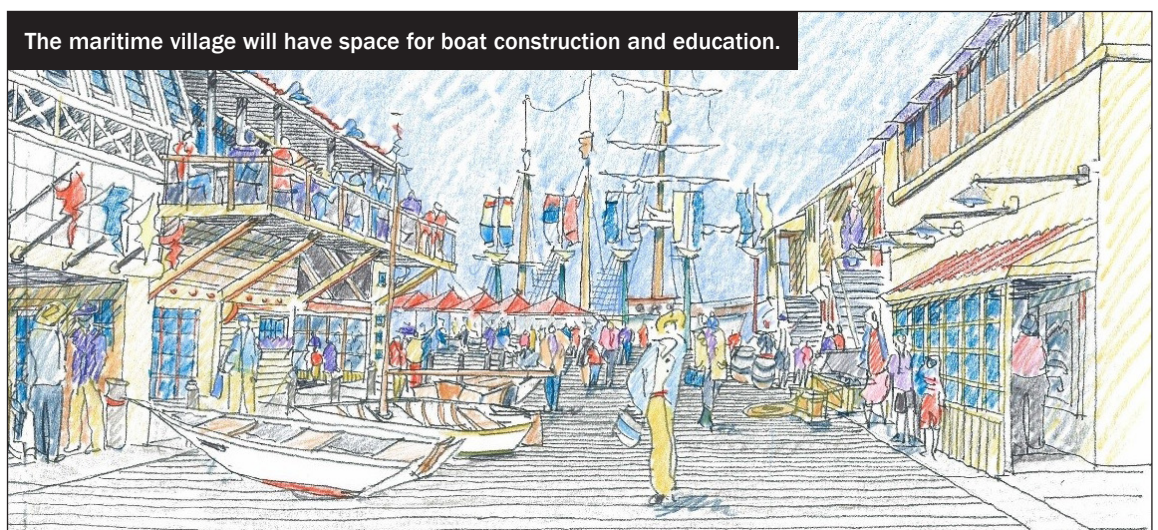
On the Washington coast, the city of Aberdeen is working with a public development authority to revitalize a former industrial area.

Aberdeen's south waterfront on the Chehalis River was once home to a thriving mill complex and active commercial boatyard. The closure of both of these businesses in the last 10 years left approximately 30 acres of property and 2,000 feet of waterfront vacant.

The idea of creating a maritime heritage center has been discussed in the community since the 1980s when the city established the Grays Harbor Historical Seaport Authority (GHSA). The public development authority has built and operates the Lady Washington tall ship and the Hawaiian Chieftain, but has not been able to complete the vision of a homeport for the ships.

Closure of the waterfront businesses created an opportunity for reuse of those properties to finally create that homeport. The city has contracted with Maul Foster & Alongi and a team of consultants to help make that vision a reality.

Approximately 5 million people per year drive through Aberdeen on their way to the Washington coast. The community is looking to encourage tourists to spend time and money in Aberdeen by



The maritime village will have space for boat construction and education.

IMAGE FROM SRG ARCHITECTS

designing a new gateway visitor center on Highway 12 at the city's entrance. Across the river, GHSA is transforming a former sawmill into a maritime heritage center.

Brandi Bednarik, GHSA executive director explains, "The Seaport Landing project is an opportunity to unite education, public waterfront access and economic development. The property's historic industrial use makes its environmental restoration and ultimate redevelopment even more significant."

GHSA plans to establish an environmental learning center on the property, a maritime training school, a woodworking shop to highlight wooden boat building and spar construction, a waterfront public access trail, and in-water moorage for the tall ships.

Maul Foster & Alongi is working with a multifaceted team including Harbor Architects, SRG Architects, Berger Partnership, Heartland LLC and BST Associates to develop strategies to fund and implement the property's cleanup and its future redevelopment.

Jim Darling and Michael Stringer, AICP, lead Maul Foster & Alongi's Seattle-based Brownfields Cleanup and Redevelopment Practice.



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ROBOTS GO WHERE NO DIVERS CAN TO RECOVER MUNITIONS

A new software system from BluHaptics allows operators to see sunken munitions in 3-D and retrieve them with remotely operated vehicles that provide human touch-like feedback.

Kane Environmental and Kane Remediation Technologies are working with a Fremont-based robotics software company, BluHaptics, to apply its new software system using remotely operated vehicles (ROVs) to identify and remove munitions from the sea floor and to sample remote deep water sediment where human divers cannot go.



BY JOHN R. KANE
KANE
ENVIRONMENTAL

BluHaptics developed the software that uses data fusion, machine learning and control technology to make ROV operations more efficient. The software works with a wide variety of ROVs, sensors and manipulator arms, which allow for operation in the most challenging conditions, such as high turbidity.

Imagine being able to control the ROV from a ship, in over 2,000 feet of water, and use the software to see the munitions in 3-D, identify the munitions type using machine

learning, and safely retrieve the munitions using BluHaptics "pilot assist" from depths where no diver can safely go.

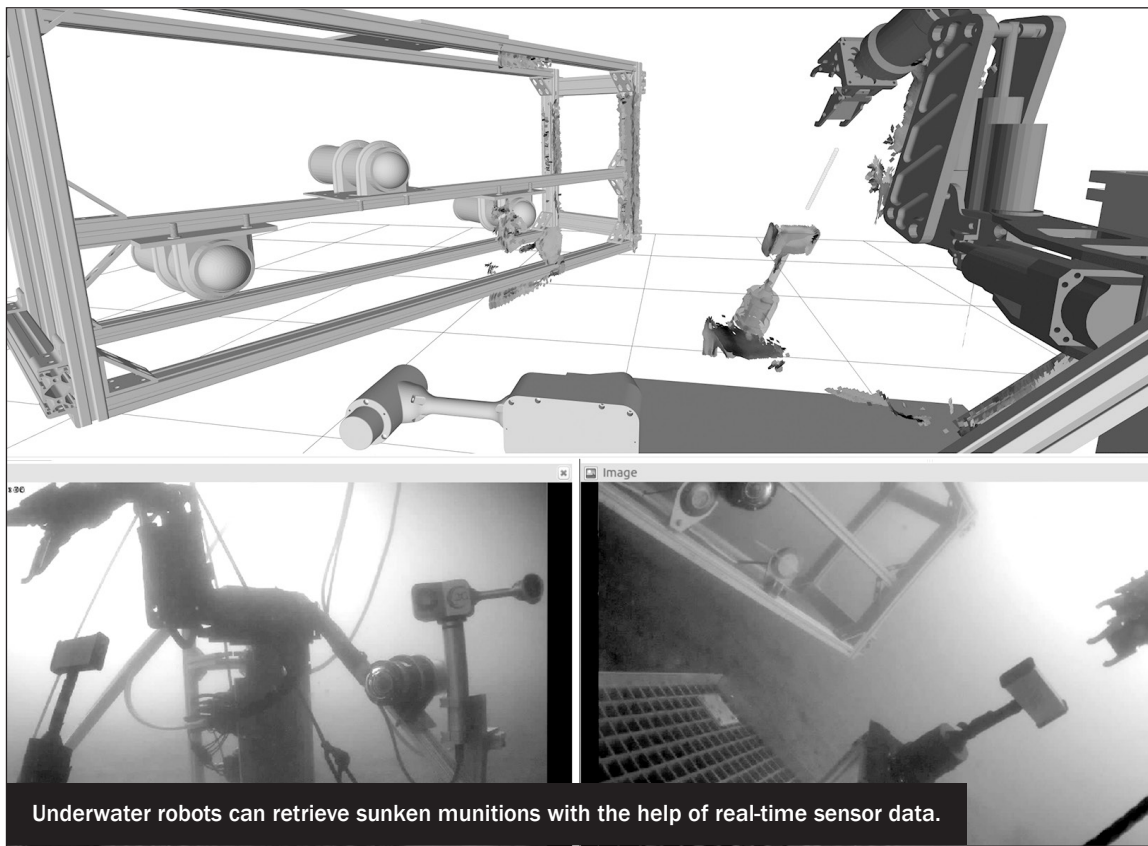
The key innovation behind the pilot assist feature is the use of assistive force feedback designed to guide the pilot towards the ideal position and orientation required for precision grasping.

BluHaptics uses real-time 3-D sensor data to:

- Generate optimal visual and force feedback depending on each situation.
- Track the operation in real-time and notify the pilot of unexpected events.
- Provide the pilot with the option to re-plan operations on the fly or, if necessary, abort.

This is only one of the uses of the BluHaptics' new technology, and due to the increased safety, efficiency and significant cost-savings of the approach, we expect this to be the standard of the industry very soon.

John R. Kane is CEO and president of Kane Environmental and Kane Remediation Technologies in Seattle.



Underwater robots can retrieve sunken munitions with the help of real-time sensor data.

IMAGE FROM KANE ENVIRONMENTAL

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STILL MUCH TO LEARN ABOUT THE CARBON STORY OF BUILDINGS

The importance of carbon reduction is known in the building industry, but few designers and contractors have access to enough carbon data to feel empowered to address it during design and construction.

We know that buildings are one of the biggest contributors to carbon emissions.

Thanks to efforts like the 2030 Challenge by Architecture 2030 and great leaps in terms of understanding energy consumption and a movement toward net zero energy, operational carbon is something most of us can wrap our heads around, and at least see a path to net zero energy. However, most of us would also agree that it's not happening fast enough and there's still plenty to learn about the larger carbon story of buildings — specifically, in terms of what they are made of and how they are constructed.

A few recent experiences regarding carbon emissions associated with buildings has made it increasingly clear that we don't know what we don't know. Even on the operational carbon side of the story, despite the headway we've already made, there is still a lot of work to be done.

How far we've come

The tools and knowledge are now in place to implement strategies during design that reduce the energy footprints of our buildings. The ability to actively track a building's energy footprint dur-

ing operation also exists. However, we do not have enough designers that are empowered to truly integrate energy modeling into a standard integrated design and decision making process, and there are not enough building owners using available reporting tools to vet the results.

We need critical mass

At the September 2016 Design Futures Council Leadership Summit for Sustainable Design, held in Seattle, this was a hot topic.

In a room full of building design and engineering principals, the question was still "How do we actively implement whole building energy modeling into the design process, on every project?"

There is now data that links projects that have used these modeling tools with actual proven energy reductions during operation, which turns into cost savings to owners over the lives of their buildings. Similarly, through recent conversations with professionals that have developed building operations reporting platforms, there are now vetted examples of how a building's operational efficiency can be tracked, shared graphically and optimized. This allows owners to demonstrate their buildings' efficiencies and even improve upon them.

For operational carbon, it's not a question of how do we design and track for reduced energy consumption, it's a call to action to share successes and make it the industry standard.

On the embodied carbon side, there's even more work to do.

Some designers and contractors have started to try to quantify it because they are beginning to realize the impact of the materials used to construct their buildings. For example, Skanska has partnered with the University of Washington, Architecture 2030 and Siegel & Strain Architects to fund research in partnership with the Pankow Foundation, for gathering data on all buildings that have tracked their embodied carbon. The idea is to understand relative benchmarks as a starting point, then provide a playbook of strategies and tools to reduce embodied carbon across all building types.

But again, few designers and contractors have access to enough embodied carbon data to feel empowered to address it during design and construction. Additionally, very few owners are currently compelled to work to reduce embodied carbon.

It will only be through collecting the data that exists and creating acceptable benchmarks, sharing it and then demonstrating through early adopters how a building's embodied carbon can be reduced in an impactful and fiscally positive way that we will begin to catch up with the operational carbon side of the coin.

We need both sides working in concert to successfully move toward reducing a building's carbon emissions to zero.

Action is needed

Even when we have all of the

data and tools necessary to understand and reduce carbon emissions in our buildings, there will still be hurdles for it to become the standard operating procedure in the building industry.

Unless there is a measurable accountability for a building's carbon emissions, the necessary engagement in operational efficiency, and a more concerted industry effort, the type of carbon reductions necessary in the building industry to combat climate change won't happen.

It's time for building designers, contractors and owners to put on our advocacy hats and educate ourselves on the regulations and incentives in use or in development. It is necessary for the building industry to track and reduce carbon responsibly and in a way that does not limit our ability to continue to build infrastructure and the buildings we all need to live, work, learn, heal and play in.

What we're doing

Skanska is a founding member of the Washington Businesses for Climate Action (WBCA) along with organizations including Virginia Mason, REI and Starbucks. The purpose of the WBCA is to bring together leading Washington businesses across industries and create a forum for understanding proposed climate action legislation. It's also a place for industries to voice their concerns and preferred outcomes around exist-

ing climate action proposals, and a platform for businesses to come together to advocate for responsible climate action policies.

Carbon reduction is on the forefront of proposed policies and legislation, including Initiative 732 that is on the November ballot, as well as a host of proposals coming from the governor's office, legislators and other climate action groups.

If those of us in the building industry don't educate ourselves on what is coming and proactively have a voice in impacting proposed carbon reduction strategies, we will simply have to take what comes and react versus work to ensure our industry and our environment benefit.

Now is the time

Whether it's an understanding and tracking of operational efficiency, a baseline understanding of embodied carbon in buildings, or an education on climate action policy and its impact on the building industry, we really don't know what we don't know, and we don't track what we don't have to. Now is the time to learn and act.

Stacy Smedley is sustainability director at Skanska USA, providing strategic guidance for local and national projects. Smedley came from KMD Architects, where she was project manager for the Bertschi School Living Science Building.

PASSIVE HOUSE

CONTINUED FROM PAGE 9

climate change represents a serious threat. We understand that humanity needs to rapidly change the way we use and produce energy. This is why Seattle's Climate Action Plan calls for net zero greenhouse gas (GHG) emissions by 2050, and King County calls for an 80 percent reduction by the same date.

Real cause for climate hope has emerged recently. The plummeting price of renewable energy, batteries and electric vehicles makes meaningful GHG reductions doable. Financial analysts from Citi, Bloomberg New Energy Finance and Alliance Bernstein argue that because solar, wind and EVs are powered by technology, innovation will continue to drive costs down. This cost shift is causing a fundamental and increasingly disruptive transition away from "business as usual."

The key question is whether

that transition will happen quickly enough to achieve climate security.

Answering this question rests in large part on what we do with our buildings. Buildings consume nearly half of all energy in the U.S., and are responsible for over a third of GHG emissions in King County. Viewed through the lens of climate change, buildings are a problem.

But buildings could readily become part of the solution. Just as cheap renewable energy, batteries and EVs are changing the rules of the climate change game and making climate action practical, so too can Passive House design.

The genius of the Passive House approach is that it views the building itself — its skeleton and skin — as a technology. Innovation can therefore drive down both energy demand and the cost of meeting that demand. Passive House buildings rou-

tinely use 90 percent less heating energy than conventional buildings, and up to 75 percent less total energy.

When a project team does its first Passive House building, construction tends to cost a bit more, but the learning curve is short. By the second or third project this cost premium often drops 2-3 percent on multifamily and commercial buildings. When you factor in superior building quality, better comfort, indoor air quality and lower utility bills, this small cost premium leverages a lot of value in terms of higher rents, and lower vacancies and maintenance costs.

Passive House is scalable because it pencils. Other jurisdictions in North America recognize this and have begun to harness Passive House to deliver on both climate action and affordable housing goals, recognizing that low energy bills

mean reduced energy poverty for building residents:

- The New York Energy Research and Development Authority made Passive House the centerpiece of its \$27 million incentive for building energy efficiency.

- The Pennsylvania Housing Finance Agency uses Passive House performance as a key criterion for the award of Low Income Housing Tax Credits, spurring dozens of affordable multifamily Passive House projects throughout the state. Ohio, New Jersey, New York, Massachusetts, Rhode Island, Illinois, Connecticut, New Hampshire and Idaho have followed suit.

- The newly adopted Zero Emissions Building Plan of the city of Vancouver, British Columbia, positions Passive House design and construction as the model for future building in the city. The

Vancouver Affordable Housing Authority is a big proponent.

It is time for the Seattle region to reclaim its position of national leadership in green building. The city's Living Building pilot program is a great step. The next step is to scale up: capitalize on the predictive modeling of Passive House to create a catalyst that is all carrot and no stick, providing policy-makers and developers with the certainty they need to make green projects happen and building-as-climate-action to scale.

To this end we are working with Passive House Northwest and others on the 20 by 2020 Building Catalyst, a campaign to reward buildings over 20,000 square feet that achieve 20 EUI (energy use intensity) by the year 2020.

Zack Semke is chief marketing officer at NK Architects in Seattle.

SURVEYS

HART CROWSER

Specialty: Environmental and geotechnical engineering, natural resources

Management: David Winter, president and CEO; Jeff Wagner, COO; Mike Ehlebracht, environmental services manager

Founded: 1974

Headquarters: Seattle

2015 revenues: \$20 million

Projected 2016 revenues: \$22 million

Projects: Governors Island redevelopment, New York; Holden Mine remediation and natural resource damage assessment, Chelan; County of Maui municipal stormwater, Hawaii

Hart Crowser president and CEO David Winter discussed what's ahead for the company.

Q: You were recently named CEO and Jeff Wagner was named COO. Are you making any changes? What's at the top of your agenda?

A: We are working to diversify Hart Crowser both geographically and technically to offset the inevitable ups and downs of any marketplace. We have recently opened new offices in Honolulu and Spokane, both targeting primarily environmental clients, and we have added owner's rep services for oil and gas clients

around the world.

Our company has always focused on finding solutions for our clients. I don't think that will ever change — nor should it.

Q: What challenges does the company face?

A: The reduction of funding for the Ecology Toxics Fund has affected our project load from this key client. With all of the other budget challenges facing our legislators it's hard to predict that full funding will come back any time soon.

We are also seeing more and more government contracts set aside for small and disadvantaged businesses and higher subcontract utilization goals for these types of firms. This can have the effect of cutting us out of opportunities for prime and sub work for government clients.

Q: Any thoughts on Washington's carbon tax ballot measure?

A: Our general policy is to support legislation that fosters business and business opportunities in Washington. We have concerns the carbon tax measure may do the opposite.

Q: Hart Crowser has been expanding its disaster resili-

ence services. Have clients become more concerned about preparedness?

A: Yes. A good example is at Governors Island in New York Harbor. A key design element was use of fill soil and a special planting mix designed to withstand long-term sea level rise. The design was unexpectedly tested during Hurricane Sandy, and only a fraction of the plantings were lost and there was no significant erosion.

Closer to home, Ecology and EPA are emphasizing taking into

account climate change impacts on the selection and maintenance of cleanup actions. We are getting involved in a study for Ecology evaluating potential climate change impacts to existing and planned remedial actions and habitat restoration projects.

Q: How has your staffing changed over the past year?

A: We have been hiring steadily in our geotechnical engineering business unit. In our environmental and natural resources business units we have been tar-

getting our hiring on specialized capabilities or specific locations.

I think it is a pretty typical hiring market these days, although the salary demands can be surprising.

Q: What does the company do to recruit and hold on to top talent?

A: We attract and keep senior staff by giving them opportunities to take on real responsibility and build their own strong client base. We are a very entrepreneurial company.



Hart Crowser is consulting the U.S. Forest Service on the Holden Mine cleanup near Lake Chelan.

PHOTO BY MARK DAGEL/HART CROWSER

SHANNON & WILSON

Specialty: Geotechnical and environmental engineering

Management: Gerard Buechel, president

Founded: 1954

Headquarters: Seattle

2015 revenues: \$58 million

Projected 2016 revenues: \$62 million

Projects: Elliott Bay Seawall (city of Seattle); Interstate 5/Joint Base Lewis-McChord interchanges (WSDOT); 200 Occidental (Urban Visions), Pioneer Square

Katie Walter and Meg Strong, both vice presidents at Shannon & Wilson, shared the latest on their company's plans and what's new in the local market.

Q: You opened your 12th office last year. What other growth plans are in store?

A: We are excited to have opened our Washington, D.C., office, expanding our service area in the mid-Atlantic and East Coast region.

We are actively looking for teaming opportunities with both our existing teaming partners as well as expanding our network of clients and partners in the area.

We hired Axel Nitschke, a national tunneling expert, to manage this office and build our East Coast business.

Q: The majority of your work is for public-sector clients. How has funding held up?

A: The recent passing of the state transportation budget injected much-needed capital into the marketplace, which is generating new project work.

In addition, should the pending vote on the Sound Transit 3 funding be approved, public-sector opportunities will significantly increase.

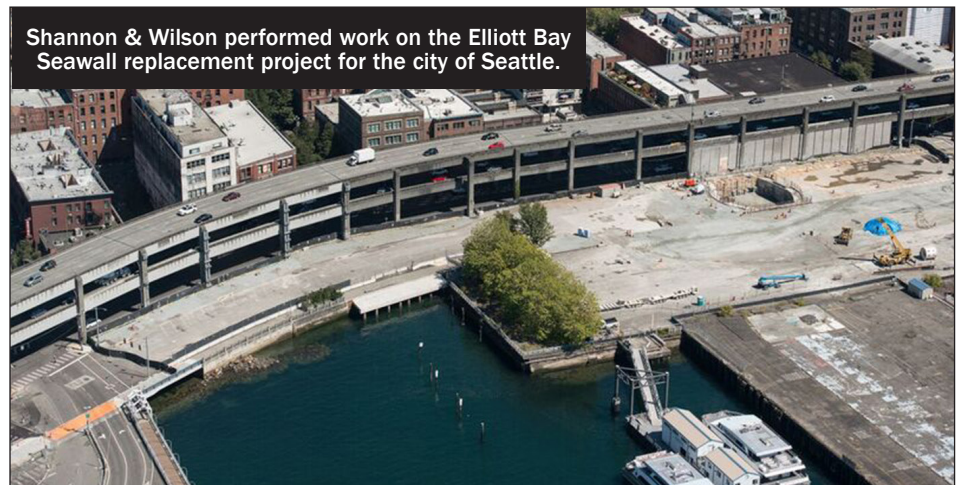
Q: How do you see the local market evolving?

A: Infrastructure-related work is growing and we are well positioned for this type of work.

We are seeing local agencies hiring again, and this has decreased opportunities to provide consulting services to these agencies.

Q: Describe an interesting or challenging project you've started in the past year.

A: Shannon & Wilson is excited to have recently won and begin work on design and engineering of the Lower Duwamish River Floodplain Restoration and Levee Realignment Project for Clallam County. This project taps many of Shannon & Wilson's strengths in the geotechnical and environmental sides of the firm, and



Shannon & Wilson performed work on the Elliott Bay Seawall replacement project for the city of Seattle.

PHOTO BY JAY DOTSON PHOTOGRAPHY

involves levee setback design, floodplain habitat restoration, rural roadway design, permitting and construction.

The project challenges include a large number of stakeholders and property owners, the expedited design and permit schedule and regulatory review, as well as the constraints in managing significant grant funding deadlines.

Q: What's something you wish more people knew about Shannon & Wilson?

A: Shannon & Wilson is well known as a local geotechnical engineering firm, but we'd like to let people know we have deep resources in many other fields and locations. Our clients' projects are often complicated and require a multidisciplinary

approach to solve their issues.

We can give them one-stop, integrated services for environmental, natural resources, surface water, permitting, instrumentation, data management, construction management, tunneling, laboratory testing, groundwater, arctic engineering and construction materials testing.

We're also a 300-person firm located in 12 offices around the United States.

In addition, our environmental capabilities are valued highly by our clients. For example, Sound Transit staff recently lauded one of our environmental engineers for reducing their project environmental risk and saving them significant sums of money.

SURVEYS

LANDAU ASSOCIATES

Specialty: Geotechnical and environmental solutions that help clients comply with environmental regulations and achieve their business objectives

Management: Jay Bower, CEO; Chip Halbert, permitting and compliance services director; Jerry Ninteman, environmental remediation services director; Calvin McCaughan, geotechnical services director; Scott Woerman, client services director

Founded: 1982

Headquarters: Edmonds

2015 revenues: \$13 million

Projected 2016 revenues: \$14 million

Projects: Secure cover system for the Cornwall Avenue Landfill at the Port of Bellingham; environmental permitting for a new engine testing lab in Skagit County for Paccar; cleanup of a former dry cleaner chemical supply facility in Seattle's Greenwood neighborhood

Scott Woerman, client services

director of Landau Associates, answered questions from the DJC about his firm and the industry.

Q: How can cities become more sustainable?

A: One of the biggest hurdles to reaching sustainability goals in our cities is getting people to accept changes that must be made in how things have traditionally been done. Once they understand the long-term benefits of short-term costs and disruption — be it construction of mass transit systems, mandates for clean energy use or implementation of green building codes — the more willing they'll be to make the necessary investments to achieve sustainability.

Q: What is the biggest environmental issue in real estate?

A: There is shortage of "clean" developable land within the urban core. This results in a need for interaction with the Washing-



Landau designed a secure cover system for the Cornwall Avenue Landfill in Bellingham.

PHOTO COURTESY OF LANDAU ASSOCIATES

ton Department of Ecology to reach "closure" on most properties slated for development. The budget and process challenges at Ecology, primarily with the Voluntary Cleanup Program, are resulting in significant uncertainty in the cleanup process that affects project schedules and costs.

Q: What are the biggest trends and issues in your industry locally?

A: Critical infrastructure, transportation, water resources, information, and renewable and distributed energy. Timely, creative

and cost-effective solutions are required to address the environmental challenges associated with implementing these types of projects.

Q: Which services are most in demand and where do you see growth in the next five years?

A: Management of stormwater runoff to protect our urban streams and Puget Sound will continue to receive significant attention as we gain a better understanding of how urban runoff impacts our environment. The demand for all services related to new industrial and commercial

development or facility expansion continues to grow; services include civil/geotechnical engineering and permitting associated with air, water resources and water quality, habitat, and critical areas.

Q: What's the next frontier for sustainability?

A: In many ways, discussions previously focused on sustainability are being replaced with discussions focused on resiliency and adaptation to meet the demands of a changing environment, particularly as it relates to climate change.



Taylor Shellfish last year installed a new groundwater supply well in Mason County. Coho supports Taylor on water issues.

PHOTO BY CHRIS PITRE

COHO WATER RESOURCES

Specialty: Integrated water resources management, water rights and groundwater development

Management: Sheryl Wilhelm and Chris Pitre, principals and owners

Founded: 2015

Headquarters: Seattle

2015 revenue: N/A

Projected 2016 revenue: \$200,000

Projects: Water rights audit for a mid-sized city; solving water issues for Taylor Shellfish; helping Sundale Orchards change its water rights to allow expanded use with water saved from irrigation efficiency

Chris Pitre, co-founder of Coho Water Resources, answered questions from the DJC about his firm's activities and what's around the corner for the sustainability movement.

Q: When did you start your firm?

A: My partner and I founded Coho Water Resources in October 2015. After more than 15 years with Golder Associates, it felt like the perfect time to take things in our own direction.

Coho's projects involve integrating technical, legal and policy aspects of water resources management.

We focus on water rights and groundwater management, but also have projects doing watershed planning for a Puget Sound tribe, facilitating development

of additional water supply for a joint private-tribal partnership, identifying and accessing new water supplies for public and private clients, and planning for drilling a large municipal well in Eastern Washington.

Q: What are trends and issues in your industry?

A: The Department of Ecology manages water in Washington and has worked hard to develop creative approaches to water management. However, recent court decisions have severely constrained Ecology's discretion, making it very difficult to get water availability certificates to start housing construction in some areas, such as in Skagit County.

"Regulation by litigation" is not efficient, but I believe it will prevail for the foreseeable future. In this environment, protection of water right assets is a must, developing mitigation packages for new water rights is becoming more difficult, and water markets involving the exchange of rights between private entities are developing.

Q: What is your outlook for Puget Sound?

A: Puget Sound is blessed with water, but population growth and climate change are causing a general tightening up of water availability. Though most people intuitively understand the predicted impacts of climate change on snow-pack dependent surface

water supply, the 2015 drought summer severely impacted groundwater supply. Rising sea levels will also increase the risk of saline intrusion into water supply wells near the coast.

While climate change may seem gradual, the impacts are already happening and it is advisable for water managers to start taking or at least planning action now.

Q: How can the Puget Sound region become more sustainable?

A: Its cities have done much for sustainable water resources management. Seattle has implemented a successful water conservation program. Tacoma is building a second water supply pipeline that includes water delivery to the Lakehaven Water District for an underground water storage program called Aquifer Storage and Recovery. The LOTT wastewater consortium (Lacey, Olympia, Tumwater and Thurston County) is at the forefront of reclaimed water use in Washington, producing and delivering high-quality treated water.

These projects are possible due to the significant political and financial resources these entities can mobilize. Smaller towns and agricultural interests need support to get into the game. Making the permitting process easier and more responsive is the first step in that direction.

SURVEYS

SOUNDEARTH STRATEGIES

Specialty: Environmental remediation investigation and design, stormwater, permitting

Management: Ryan Bixby, president and CEO; John Funderburk and Chris Carter, principal scientists; Terry Montoya and Charles E. Robinson, principal engineers

Founded: 2001

Headquarters: Seattle

2015 revenues: \$12.8 million

Projected 2016 revenues: \$13.5 million

Projects: Integrated remediation system at Viktoria Apartments in Seattle; electrical resistance heating treatment system to remove solvents from the sub-surface of a site in Seattle

Chris Carter, an executive vice president with SoundEarth Strategies, answered questions from the DJC about the industry and his firm.

Q: What is the biggest environmental issue in real estate?

A: It is enrollment in regulatory oversight programs and technical response from Ecology. Many cleanups are managed through the Washington Department of Ecology. Most cities and counties don't have the technical resources to review environmental conditions of properties in their jurisdictions and default to Ecology for regulatory oversight. This leaves Ecology responsible for a majority of enforcement and

guidance.

Factor in additional pressure on the Northwest Region of Ecology because of heavy demand from development in the greater Seattle area, and limited resources due to a budget tied to revenue generated from oil and gas taxes, and the result is a substantial bottleneck for site closure.

It can take over a year to obtain a site closure opinion through Ecology's Voluntary Cleanup Program. This can have major implications for property owners and developers trying to obtain financing.

Q: What are the biggest trends and issues in your industry locally?

A: The focus of regulatory agencies on pollutant source control is intensifying, particularly for stormwater. Several large cleanups are planned or underway in areas like the Lower Duwamish Waterway, and with lots of time, energy and money being poured into cleanup, upland pollutant source controls are being emphasized.

The challenge is identifying pollutant sources that can be managed effectively. Ecology manages pollutant point sources on industrial facilities through a general permit, but this only addresses a small fraction of the overall contributions. Roads, residential and commercial prop-

erties, and non-permitted industrial facilities, all contribute pollutants via stormwater to waters of the state.

Q: How can cities become more sustainable?

A: As the population grows, more pressure is put on the aging infrastructure of our cities, and demands for limited resources like clean water and energy increase. Waste controls and reducing resource demands are critical to a sustainable future. Through improvements in building design and product technologies, integration of sustainable building practices into building codes, and education, the net impacts from our everyday needs can be greatly reduced.

Q: Which sectors of your com-

pany are performing particularly well?

A: Stormwater and development construction. Stormwater has a lot of regulatory drivers, including public awareness, fisheries and the presence of sensitive receiving water bodies like the Puget Sound. These drive industry demands for compliance management and support.

The demand for construction support is obvious, given the changing landscape of our cities. Many of the sites being redeveloped are located in former industrial zones or include historical uses like gas stations and dry cleaners. It is common to encounter environmental conditions on these properties that require research, investigation and management.

Q: What's the next frontier for

sustainability?

A: Innovative design will aid in the development of products that are more resilient, have a longer life, and use raw materials from other recycled waste products. Many pollutants we end up managing on regulated facilities come from common building materials like galvanized metals and from consumable parts like vehicle tires and brake pads. The uses of these products are ubiquitous and alternatives are limited.

Recognition of the impacts of these products, education, and consumer-driven demand will help us more effectively contain potential pollutants and minimize contributions to our waste streams.



An electrical resistance heating treatment system was installed at 700 Dexter Ave. in Seattle to remove solvent contamination.

PHOTO COURTESY OF SOUNDEARTH STRATEGIES

EVERGREEN CERTIFIED

Specialty: Green project verification and green technology consulting

Management: Tadashi Shiga, owner

Founded: 2009

Headquarters: Seattle

2015 revenues: \$600,000

Projected 2016 revenues: \$750,000

Projects: New Rainier Vista housing development for Dwell Development, Columbia City; 13th and Pike Passive House apartments for Cascade Built, Capitol Hill; Grow Community multifamily development for Asani, Bainbridge Island

Tadashi Shiga, owner of Evergreen Certified, didn't exactly pick the most auspicious moment to start his new green consulting firm.

That was in 2009, "during the worst real estate market of our generation," he said. "There were foreclosures going on all around us."

Yet here he is, still standing seven years later.

Company revenues have been

growing at a 30 percent clip annually "almost since we started," Shiga said.

Evergreen Certified now has six employees and plans to hire more staff next year.

Green is not expensive

Shiga said the difficult economic environment in 2009 challenged him to consider how to help clients make more cost-effective decisions.

Builders sometimes think green building "is expensive and not profitable," Shiga said, but "during the downturn we proved that building green is good for business."

Evergreen Certified is who you call when you need a third party to certify your Built Green project. The company also consults on green technologies and how to meet requirements for other green-building standards, such as Energy Star, Passive House, Net Zero Energy and National Green Building Standard.

The company counts among its clients more than 200 build-



Evergreen Certified was the third-party energy certifier for New Rainier Vista, 42 units of market-rate housing developed by Dwell Development.

PHOTO BY TUCKER ENGLISH

ers and 30 architectural firms. Most of its consulting work is for residential projects.

Green building programs

Evergreen Certified inspects projects throughout the construction process and then tests them once they're complete. It also tracks construction waste, recy-

cling, and more — "the effects of the whole building cycle," Shiga said.

The company is looking to expand its reach to the commercial and industrial sectors, mainly as a technology consultant.

Shiga lauded Seattle as a city with a "bright and sustainable future," and one where continued population and econom-

ic growth will supply a steady stream of new business.

The city does a great job promoting its green building programs, he said, but the suburbs need to catch up.

"I would like to see others follow Seattle's lead" in promoting sustainable development and encouraging higher densities, he said.