

*Transcript of SRI Webinar Series: Green Infrastructure: Reusing Superfund Sites and Promoting Sustainable Communities*

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Hello. My name is Jean. In the lower left half of the screen, you see live closed captioning. We are making that available for today's session. That stream will kick on in just a moment. Along the right-hand side, look at that, the captioning is just beginning now as I mentioned. Those scrolling boxes will show live closed captioning as we broadcast today's event. On the right-hand side, you will see other links included -- including URLs, queue and a window, and information about our sponsors and instructors. Looks like we have gathered to our scheduled kickoff time of 2:00 p.m. Eastern for today's webinar on Green Infrastructure. Before I launch into my formal instructions, let me check first with our organizers. Melissa Friedland and Michele Mahoney, are you both prepared to begin?

Yes, we are.

With that, let me officially begin the recording for today's webinar. Welcome, everyone to today's Internet seminar on Green Infrastructure: Reusing Superfund Sites and Promoting Sustainable Communities. Today's session has been sponsored by the EPA office of solid waste and emergency response and Superfund remediation and technology innovation group. I'm going to serve as a technical moderator behind the scenes. Running is Jean Baum, from the technology in field services division. In just a moment, I'll turn things over to your formal session moderator, Michele Mahoney. Before I do so, I'd like to walk through a series of housekeeping instructions for those of you joining us for today's webinar. Today's entire broadcast will be offered online using Adobe Connect. You should have received both a registration e-mail as well as a reminder message for today's webinar with a complete set of instructions on how to join us for the live broadcast. Either of those e-mails will point you to something known as the seminar homepage. If you click or follow that link to the seminar homepage, you can read more about today's broadcast. You will find bios for our instructors. There are links to download the presentation materials and other resources as well as an opportunity to provide feedback for these webinars. For now, to join us for today's live broadcast, you should click a button that appears in the upper left corner of that page labeled go to seminar. Once you click, you will be asked to identify yourself by name as well as the number of people at your location. You

should be successfully checked in through Adobe Connect and brought through our interactive webinar environment. Make sure you use the same spelling of your first and last name as he registered. If you have technical problems or don't have access, to live Internet for the next two hours, you can download copies of the presentation materials and follow along by phone. We encourage you to try to troubleshoot whatever issues you might be having and try to join us online using Adobe Connect for the interactive experience. Audio will be available to ways for today's broadcast. By default everyone can listen online using their computer speakers or with a pair of headphones. If you have problems with the online audio, make sure that speaker icon should appear in the upper right of your screen. It is shaded bright green. Locally check your volume settings. Make sure your computer speakers are adjusted appropriately. You may need to go to the sound control panel to increase audio. If that that doesn't solve the online problems, we do have toll-free call-in information for a number -- limited number. If you need that number, please use the question box in the lower right corner to request it. If you join us on the phone lines you will be placed on a global. And we ask you remain on global mute to cut down on audio disruptions. As I mentioned we do have a Q&A or question window which appears in the lower right corner. That window will be available throughout the entire broadcast and can be used to submit your comments, questions and report technical problems at any time. I encourage you to take a moment and test that feature out. You can click on the empty box at the bottom of the Q&A window, type a message and let me know how the audio and visuals are coming through for your location. When you're done, hit the enter key or press the small cartoon bubble butts into the right. That will privately submit your message. There's no need to weight. We do have breaks scheduled throughout today's presentation at which time we'll pause and read through questions out loud so you're instructors can answer them but you don't have to wait for those breaks. I encourage you to submit questions and comments as soon as they occur. We will attempt to get through as much as we can in the time we have a lot to do today. Today's session is being recorded. As I mentioned you will automatically receive a URL in approximately one to two business days that you can use to replay today's broadcast. For those of you that have not received a live spot, they will get a copy of that recording link and you're welcome to forward that on to anybody else. Of course you can broadcast the nearly 620 or so webinars that we currently have archived on our seminar homepage. So again this is a seminar homepage which will be -- be available. It's up from this point forward, you can read more about the broadcast, you'll find links to download the slides and other resources. Contact information for our instructors, there's a feedback form you can fill out, to join us you want to click that button that appears in the upper left-hand corner. All right. You should see a screen something like this, the only addition is we will have a closed captioning window which will appear live in the lower left-hand side of your screen. Technical problems can be reported using the Q&A or question box in the lower right corner of your screen. I think that's all that I have for our technical reminders for today's session. Let's get prepared to kick things off for today's live broadcast of our Green Infrastructure webinar. I'm going to turn things

over to Michele Mahoney and Melissa Friedland. Ladies, whenever you're ready to begin?

Good afternoon. My name is Melissa Friedland and I'm EPA Superfund program manager for redevelopment. I want to thank you all for joining us today. The Superfund redevelopment initiative or SRI hosts these webinars as part of a quarterly series about the reuse of Superfund sites. Our webinars share the stories of projects that are part of SRI and they also provide guidance and tools to support the appropriate for of Superfund sites. On today's webinar, we're going to cover the topic of Green Infrastructure elements in the context of reuse and revitalization of contaminated lands. I'm going to start the presentation with a very brief introduction to reuse and EPA Superfund redevelopment initiatives. Which plays a key role in supporting reuse as a priority at EPA. I'm going to turn things over to Michele Mahoney who is going to give us an in-depth look at Green Infrastructure and how it can support sustainability. Michele is going to provide insight into strategies for considering and implementing Green Infrastructure and the types of resources available for doing so. After that we will hear from Carlos Pachon who will provide insight on the connection between Green Remediation and Green Infrastructure. We'll then hear from Tom Bloom, Jay Steffen, goal -- Douglas Reid-Green and Rosemary Caraway who will share their experiences at three sites where Green Infrastructure strategies have been implemented. These three sites will each touch on district -- different aspects of planning, funding and implementing Green Infrastructure. So I'd like to take them a few minutes just to share about reuse and the way that SRI can support site reuse and make the point again that EPA's primary mission is to protect human health and the environment and returning contaminated sites to productive use can contribute to these goals. So SRI works with communities and other partners in considering future use opportunities. And integrating appropriate reuse options into the cleanup

process. EPA's always been supportive of site reuse but in recent years, reuse has become an integral part of the agency's strategic plans and goals. And it's very important to note that reuse considerations can and should be explored at any point during the Superfund cleanup process. There are many different ways to reuse Superfund sites. And there is no one-size-fits-all solution to determining which reuse type will be most appropriate. Many sites can support multiple types of reuse, for example a single site could host recreational reuse including playground equipment and sports fields and that also support ecological reuse as a wetlands environmental education area. I want to encourage you to visit the SRI website to find more examples like this. As well as in-depth information about Superfund site reuse and if you have any questions about reuse or SRI, please do not hesitate to contact me. And I want to encourage you to send in questions for our visitors. We'll try and answer questions after each section but we may hold some questions if we see future presenters will address them. There will also be time at the end of the presentations for remaining questions. First up is Michele Mahoney for EPA's technology innovation and field services division.

Thank you.

Gene, can you pull up my slides -- Jean? Thank you very much, Melissa. My name is Michele Mahoney. I work with EPA's technology innovation innovation and field services division. I'm just going to talk a little bit about Green Infrastructure and how it can be incorporated into Superfund reuse planning. I wanted to start out with a definition of Green Infrastructure. In general it's a framework for understanding the valuable services that nature provides for the human environment. And integrating these natural assets into planning and development. Typically, communities will set aside space for commercial or industrial development, but sometimes space for parks, recreational areas and conservation may be limited. And in these cases, Superfund sites can present a rare opportunity to open up a large area of land that can be strategically -- has been located in a community and it could be considered for some of these Green Infrastructure elements. There's lots of benefits to incorporating Green Infrastructure into Superfund site reuse. Listed here on the slide, I'll read a couple of them. Green Infrastructure can help EPA meet a range of our program goals including promoting sustainable communities, environmental justice and clean urban waters, it's a viable reuse option for this site. It can be also used as an interim use for the -- for part of the site during the long-term cleanup. It can be a way for managing drainage from caps at Superfund sites. It can bring together partners and the different funding sources for the reuse of the site. There's also educational opportunities for schools and the residence. And it can reveal its allies the community with a sustainable reinvestment to offset the stigma that has been there with the Superfund site. So the Superfund reuse planning projects across the country, we see a common set of green in the structure goals that can be considered in the reuse planning process. You'll see these listed on the slide. Revitalize the site ecology, improve stormwater, increase Recreational Amenities. One or more of these goals might be the main focus of the reuse plan or there could be smaller Green Infrastructure elements integrated into the reuse plans. Focusing on economic opportunities, and other community amenities. With each of these goals, there's a common set of strategies. I also want to mention that these goals are not mutually exclusive of each other. And often a reuse plan will include multiple goals and strategies. So I'm going to go over each of these goals and related strategies and then you will hear from my co-presenters who will provide more in-depth look at how specific sites are related to these goals. So the first goal of revitalizing the site ecology, ecological revitalization strategies create optimal living conditions for aquatic and terrestrial species. Revitalizing natural areas to create or improve wildlife habitat can occur on portions of the site as it's being reused, the other parts of the site that have different types of uses, providing community residence with the opportunity to enjoy bike paths, walking paths, native woodlands, wildlife viewing areas and areas of natural beauty. Some of these strategies that can be used to revitalize the site ecology include habitat restoration, phytoremediation, environmental education opportunities and greening economies. Pictured here on the slide, we have the Quincy Smelter as an example. This is one of the most complete remaining 19th century copper smelter's in the world. This smelter is offering opportunities to learn about some of the historic in -- how the environmental impacts of mining can be addressed as well as restore the community's connection

to the waterfront. This site is also going to be future home of a national park visitor center. The next goal is improving stormwater. Primarily means naturally directing and cleaning stormwater and preventing erosion and the need for expensive great infrastructure elements. Some strategies included with improving stormwater construction wetlands, natural drainage, bioswales and floodplains. So the economic vitality and quality of the neighborhood housing of the Eastside neighborhood in Freeport, Illinois where you see photos here were severely impacted over time by the neighborhood's location to the river floodway. The community looked at different Green Infrastructure strategies, on vacant properties, Superfund sites, brownfield sites and publicly owned lands to try to overcome the limitations they had with the existing great infrastructure to try to help reduce the flooding impacts and temporarily and safely store stormwater until it can safely drain. Another goal is to increase Recreational Amenities. This can be achieved by creating a tractor spaces for recreational activities or social gatherings. These types of amenities can improve the quality of life for communities, raise property values, some of the strategies can include trails, green streets, program spaces and green links to urban waters. The Creek industrial corridor future use plan which you see pictured on the slide, is a great example of this. It includes a strategies such as increasing the multimodal transportation with green complete streets, developing signage and educational programs, promoting recreational Creek access and restoring the community's connection to urban waters. So planning for Green Infrastructure and Superfund sites can be integrated into the typical reuse assessment and planning process. The graphic you see here outlines the reuse process and I'm going to go through and mention a few considerations for the specific Green Infrastructure and how that can be incorporated into this process. So in step one, we want to look at gathering what the community wants and needs for the site. For example, you could identify a specific habitat or watershed and recreational goals, you can consider reaching out to the local government, other agencies and nonprofit stakeholders, they might have some expertise with the local green infrastructure goals and assets. Step two, we want to determine what the site's suitability and we want to consider identifying natural assets such as water features and vegetation, identify long-term revenue components and institutional control that might prevent structural development, but good otherwise be suitable for the Green Infrastructure elements at this site. Step three, we want to evaluate the land-use context, for example, consider whether there is some Recreational Amenities that may be missing in the community and whether Green Infrastructure might fit into a larger sustainability approach to the economic development of the area. In step four, just develop some recommendations. These can include reuse plan that focuses on Green Infrastructure, uses such as habitat, watershed, recreational uses, you could also try to include some goals, principles and strategies related to implementing the Green Infrastructure as part of the reuse plan. So in today's webinar, we're very fortunate to have three in-depth case study presentations. Each of the sites that you're going to hear about are going to highlight a particular Green Infrastructure goal as you see here on the screen. I want to emphasize that Green Infrastructure projects typically employ multiple strategies to address multiple goals. These strategies can be

organically interwoven through a project and are not mutually exclusive of each other. So the sites. Don't hear from our the -- about the Butterworth landfill, we'll have tumbling from EPA and Jay Steffen from the city of Grand Rapids, Michigan to talk about the reuse of that site. We have the land it -- Landia chemical company, we'll hear from Doug about the work they're doing their to increase habitat and greenways. And then Pemaco Maywood, I believe we have have Rosemary speaking to us about some of the efforts they've taken to improve stormwater at that site. So with that I think we'll move on to our next presenter. Carlos?

No. Tumbling.

Okay.

Talk about increasing Recreational Amenities at Butterworth.

Not Carlos, it's Tom. My name is Tom Bloom, I'm the region five Superfund redevelopment coordinator. I wanted to tell everybody region five consists of six states. Minnesota, Wisconsin Illinois Indiana, Ohio and Michigan. As you heard from Michele, Green Infrastructure strategies often overlap with revitalization and remedy strategies. I'm here today to talk a little bit about the Butterworth landfill and how on-site drainage canal wetlands and [Indiscernible] all helped to promote recreational reuse. Next slide. Thank you, Jeanne. I think you did that for me. First of all I wanted to tell you a little bit about the site -- of the Butterworth -- Butterworth landfill is a 190-acre landfill located west of Grand Rapids, Michigan. It's right along the grand River in the 100-year floodplain. City of Grand Rapids owned and operated a landfill as an open come from 1950 to 1967. Then the site was operated as a sanitary landfill from 1967 to 1973 when it was closed. During its years of operation, the landfill received municipal solid waste and industrial waste including plating waste and paint waste and organic solvents. It was a commingled landfill that has hazardous and solid wastes. Of course in 1982, they identified volatile organic compounds, heavy metals coming out of the landfill and the groundwater. They also identified some of the soils were contaminated with PCBs and pesticides and tiring. Next slide if I can get there. You've got it for me, Jean? Thank you. So in 1983, the EPA added the Butterworth landfill to the national priorities list. And around 1990, we did a soil and drum removal project out there where we removed PCB contaminated soils. Shortly after that, 1992 we selected a remedy for the landfill that had already been covered but our remedy consisted of upgrading the landfill covered with 2 feet of compressed clay and then 2 feet of cover materials with continued groundwater monitoring. During the design, we discovered that part of the landfill, the 190 acres wasn't covered. There was a portion in the middle that you'll see later on on Jay's slides called the radio station tower and Billy area about 30 acres in the middle of the landfill that didn't receive any waste. So we changed the remedy to address the fact that we didn't have to cover 190 acres that we were going to omit 30 acres from that. And then also there was some changes to groundwater -- sorry, some surface water interface standards from the state of Michigan. So we changed the cleanup goals there in 1998. Shortly after that, 1999, we started

constructing the remedy and the cap has been complete for years now and we are just continuing to monitor the groundwater out at the site. One of the things that was done that was neat at the time instead of putting number to grapple down on all the haul roads, remember this is 190 acres landfill so there's quite a bit of whole roads out there, then having to dress them up every two or three years because the gravel would wear away, the remedial project manager at the time decided to spend the money up front to pave the whole roads and that comes into play later on when we look at some of the opportunities that the sites had to offer for us. I'm going to try to go to the next slide myself. Okay. Not going to talk a little bit about -- I'm supposed to talk about site remediation. Use of natural resources. So given site's along the banks of the river and the need for proper drainage for both remedial and reuse purposes, it made sense to use a natural vegetative -- I'm not -- vegetative stormwater drainage drainage canal that runs north and south through the site, to drain the cap and make sure that the surface water flows in the right direction. In addition it made sense to use some of the wetlands located on-site to deal with the runoff from the cap after it was put together there. Those wetlands helped to provide collections when we had high storm events, but also served as wildlife habitat areas for viewing and like that. That some of the things we identified when we were looking at the opportunities that the site presented. So by doing proper grading for surface drainage and using this canal that runs through the site and making sure that we had good vegetation for erosion control along the group -- drainage networks Institute in ditches, it should we have positive drainage off the capital but also promotes the use of the site for redevelopment later on. So I'll go to my next slide. So I'll talk about some of the initial reuse considerations. Initially, the city came to us in 2006. We did another activity, Superfund redevelopment initiative program in 2008 and then again in 2003. When we looked at the opportunities that the site had because of the size and level surface, and prime location, and the excitement of the stakeholders in the area, we knew that it had a unique opportunity for you to -- future uses. We held a couple community meetings that everybody was very interested in and the community expressed a lot of interest in all kinds of recreational opportunities including a golf driving range, archery range, a boat launch, community gardens, bike trails we were talking about, the trail system I was talking about, the haul roads, flying field for model airplanes, skate Park, BMX racing. Now, once the site was cleaned up, we site was restricted and before we could move forward we needed assurance that the future use would not harm the remedy and that the remedy would be compatible with the future recreational uses. So in 2008 we went back and did some reuse characterization where we looked at the site remedial features, Jay is going to address this a little bit more, looking at the cap and the groundwater wells where they were sticking up, where they were flush mounted, looking at some of the utilities on the site, there was some water lines brought in there and some electrical lines, not any sewer, looking at site access, looking at the drainage and the stormwater and then also looking at the site ownership and parcel information and reuse characterization report. And to bring it up further, just recently, we reengaged and did a solar reuse assessment where we looked at the site that would be suitable as far as slopes are concerned, for

solar panels, where the substations are, who needs electricity in the area, and we put that all together into an assessment and Jay is going to talk a little bit more about that right now. Go ahead, Jay.

Good afternoon. My name is Jay Steffen, estate planning director with the city of Grand Rapids. I'd like to start out by saying that we have enjoyed a very cooperative relationship with the EPA and appreciate all of their assistance in helping us to come up with reuse ideas and which will be further discussed in the presentation. The slide you're seeing here was a risk assessment graphic that was completed in 2003. Tom mentioned those haul roads throughout the 190 acres not only offered the opportunity to provide vehicular access, but also to use those roads as a trail system. So in 2003, we completed a risk assessment at EPA's request in order to put those roads into use as nonmotorized trails. In 2004, the Superfund Redevelopment Initiative provided a regional seat jumpstart the first of several reuse assessment that the site. That same year the city of Grand Rapids included the side reuse ideas in its city's master plan. And additionally the EPA announced that here the start of the return to use initiative at that site. This meant that the EPA would work with site stakeholders to address barriers that might hinder safe and appropriate reuse, during the return to reuse initiative. Those roads were opened up as trails. The site was opened and the keep out signs were removed from the site. To provide long-term stewardship of the site and to ensure that any future uses maintain protection of human health and environment, GEPA and city continued working with the community to develop a site use framework and conceptual design plan. What you'll see throughout is that this has been an iterative process where we've had a number of conceptual plans for the site. Those of changed, as we've discovered opportunities and constraints of developing the site for various reasons as Tom mentioned, the part of developing -- the tough part is to put in for structure in that would allow for and support recreational uses, specifically water and sewer can be challenging and quite expensive. We held public meetings in 2005 to help inform the reuse project. And that spawned a number of ideas for viable recreation amenities. The early reuse goals were open space trails, boat launch with longer-term transition to sports fields, model aeronautics, skateboard park and dog park. Reuse discussions became more refined as future site users were surveyed in 2006. We did some additional conceptual plans that included two options, one was trails, boating access and interpretive exhibits along the riparian area near the grand River. And the second plan concept that had nonmotorized trails, BMX Park, skate Park and special events area in the northeast quadrant of the site. The next slide that you'll see, once again is the refinement of the plan. So this was a point in the project where GEPA provided services from SKIO and they put together a project that was once again financed by EPA region five. The document built on previous years of reuse framework discussions. It was designed as a screening tool to provide a foundation of fundamental site specific information and considerations for future uses of the site. It provided five site maps, each emphasizing a different aspect of site conditions and highlighting associated issues for consideration and future use deliberations. These five maps identified specific details relating to the remedy utilities, access drainage and stormwater. And property personal ownership. In



2010 the city used this reuse characterization as an opportunity and constraints document for a site master plan study. What you see on the screen is a master plan that was completed in 2010 as part of the green Grand Rapids city master plan update. We conducted a two-day design survey to complete this plan. The design was held at a public facility located close to the former landfill. The format was an open house type of event and participants were able to drop in at the location, view the characterization reuse studies, provide ideas and input into the design and also watch a video showing examples of other Superfund sites that had been opened and improved for recreational purposes. This video really was key as there were many in the community who were skeptical that this site could actually be reused for something. And so the video was a live example of some other landfill Superfund sites around the United States that had already been converted and reused for recreational purposes. It culminated in a presentation at the end of two days, and people were given additional opportunity to comment on the plan. The plan was also reviewed as part of the public comment period for the update of the 60 -- city's master plan. The plan is probably hard to read so I'll read off if you will, a couple of the uses that we proposed for the site. It came from suggestions for the community. And it included a special event Festival space, multiuse playground, dog park, sports field, archery, restrooms, picnic area with shelter, parts department, greenhouses and maintenance building, boat launch, landfill, in -- farmers market, come into gardens, greenhouses and prairie restoration area. The low impact development strategies envisioned for the site included rain gardens, filter strips and vegetative swales. You can see on this plan, that there were in fact some wetlands created on the site. And this can be seen in the upper right-hand corner, shown in blue and also on a diagonal here in the middle of the left-hand side of your screen. Over the years, the city stakeholders used these assessments in the master plan to help bring about recreational reuse to the site. In 2009, access road expansions were used to connect the site to the area's regional network of bike trails, the on-site trail runs from the northern portion of the site through an on-site wetlands stormwater retention area. The city and EPA worked together to facilitate use of this access road for running marathons and other events at the site. The boat ramp that was shown in the plan existed, but it was closed during the remediation and the city is working to put it back in service. The city has applied for and received a grant from the Michigan Department of natural resources waterways division to complete a preliminary design for parking to support the ramp, the city is working closely with local fishing organizations in that preliminary design. Other recreational opportunities are still under consideration at this site. To keep reuse possibilities moving forward in 2011, region five again helped us developing a renewable energy assessment to determine if installing a solar energy facility at the site would be feasible. This slide shows the solar reuse assessment. It

is suggested that approximately 38 acres of the site could be suitable for solar installation. The report also recommended dedicating 54 acres to recreational and open space along the grand River and in the northwestern portion of the site. The study was in line with earlier assessments which have shown that the city and community goals were to preserve these areas for recreational use. If you take a look

at that map, you will see the green areas were recommended as recreation. And the report indicated the orange areas as potential locations for solar development. This year the city released a request for proposals for a solar energy generating facility. And the city received six proposals and narrow the field to three, held interviews with the three shortlisted firms and have chosen a preferred solar provider. Today we received approval from the city commission to authorize staff to negotiate a land lease and power purchase agreement with the preferred solar provider. The proposed solar facility would be approximately 20 acres in size and the energy generated will be transmitted across the grand River to the city's wastewater treatment plant. And it is estimated that the solar facilities could save the wastewater treatment plant in the range of between 200,000 and \$300,000 annually. The -- there remain many opportunities for reuse and also Green Infrastructure components of the Butterworth landfill. Approximately 30 acres of riparian corridor along the southern edge of the site bordering the grand River represents Green Infrastructure opportunities. We're hoping to put the boat ramp back in use as we are undertaking a river restoration project upstream which will provide white-water activities for the public.

Thanks, Jay, that's great. Thank you, Tom PJ, I know you have to go at 3:00 so I'm going to put some questions your way that you and Tom can deal with. One is regarding wildlife, and the landfill cap, how many feet thick is the cap?

The cap is 4 feet -- the cap is 4 feet thick. 2 feet of compacted clay, it has 18 inches of sand, and 6 inches of topsoil.

Okay. We have another question about that. How will you as a base -- address tree root growth and animals in the cap? Should they get in there, I guess?

So far, neither have been a problem. We do have an annual maintenance plan for the site. We actually mostly entire site a certain number of times per year. Based on the rainfall and weather conditions. As for animals burrowing into the site, we've not had problems with that. The only problems we've run into is when we've had vehicles, heavy vehicles that have gotten off the paved trails that have rotted the top of the cap, which have then had to be topsoil placed and additional seed put down. But the site is very low maintenance. All the plant materials that were planted as part of the remediation plan were shallow rooted plants. And so those have been working out quite well.

Okay. And we have some more questions. How was landfill gas venting addressed?

This site generates very little in the way of methane. Which is unfortunate because we explored the opportunity for harvesting the methane gas, but unfortunately, the amount that it generates is so minimal that we have no need for venting, nor are we able to harvest any of the methane gas that is being produced, which I mentioned was minimal.

That's great. Okay. We have another question shifting gears a little bit. Let's see. In designing ecological elements, to what extent did you use a soil to increase water retention?

Maybe Tom, you could help with that?

I don't think we did. I would have to talk to Dion a little bit more about it but I don't think they were used.

Okay.

That was my recollection too. There were no soil amendments. We created the wetland habitats, through grading and using the soil on-site. And that might have been trucked in.

Okay. And we have a question about cost. Where someone is asking, I'm not sure we'd be able to give you exact dollars, but what is the cost of the solar farm? \$300,000 savings after the cost of the farm? The solar farm?

Right. Very good question. And I would have to do some additional research to let you know the cost of the investment by the preferred solar provider. The way we have structured our agreement is that all those costs are borne by the sorrel -- by the solar developer. The only cost to the city are soft costs related to the city and negotiating a contract with the solar provider, the solar provider builds a facility, we lease the land to the solar provider, I believe we're looking at a 20 to 40-year lease at which time, the developer is required to remove the solar equipment from the site. Our role is simply entering a power provider agreement and buying the power from the solar provider to help power up our wastewater treatment plant.

Okay. Someone has asked a question about long-term monitoring. What are your long-term monitoring plans for health impacts, soil water and air quality?

Jay, I believe those are all part of the remedial project, the long-term monitoring. And I know that you've got a little checklist out there that Dion put together for you to go over to the landfill every so often to look at whether there is vegetative concerns and things like that. You guys are doing a good job at filling out that checklist and looking at it periodically.

Yes. Thank you, Tom.

Someone is raising a question, did the solar provider have any issues? Were they concerned about potential liability about being on a cap?

Great question in our request for proposals, we sought firms who had experience with developing solar facilities on former landfills. And in fact, three of the six responders to our request for proposal had experience developing solar facilities on former landfill sites. And so they came in well-equipped, knowing what the opportunities and constraints would be. And we made it very clear in our request for

proposals about needing to work with the cap, not damage the cap, and that any remediation necessary would be their responsibility as part of construction of their facilities.

Great. Thanks. And actually someone has asked a question: how is the planning and cleanup paid for? Tom, you want to answer that with Jay?

Sure. The planning is paid for through the Superfund Redevelopment Initiative program. The cleanup is paid for -- I'd have to ask Dion -- I'm not exactly sure who financed the cleanup of the site.

Okay. I think we probably should move on. We will get to the rest of the questions toward the end, but I think at this point I want to thank Michele and Tom and Jay. And I'm going to turn it over to Carlos Pachon.

Hello, everybody. Thank you. This is Carlos Pachon, in the same room as Melissa and Michele. We work from the same office in the Superfund program. And I'm here to give a short synopsis of the linkages between Green Remediation and Green Infrastructure, which I titled Green Remediation and Green Infrastructure for a cleaner and safer future. So understanding many in the audience may not necessarily come from a remediation background, let me give you a short intro to that concept. Green remediation is a generic term for the work that's needed to clean up contaminated soil and groundwater. As a nation, we invest literally billions of dollars every year to protect human health and environment from contaminated -- from contamination. That may have originated from historically or current activities. Cleaning up these sites, contaminated sites can be considered in and of itself a contribution to sustainable infrastructure. How can that be? Mainly because cleaning up contaminated sites frees them up for reuse, which releases development pressure on green space. We have some studies that indicate for every 1 acre of urban land that's made available for reuse, we are freeing up 4 acres of green space that would have to be developed for equivalent amount of available space because of infrastructure needs, roads, highways, utilities, et cetera. So right there from the beginning we see there are certain parallels here between the Green Infrastructure and Green Remediation. Green Infrastructure, one of the concepts, is achieving development, site development with lower environmental footprint. Green Remediation on the other hand is cleaning up contaminated sites with a low environmental footprint. That's one of the first parallels we see. Let's go to the next slide. Thanks, Michele. Before getting to a little bit more detail on Green Remediation, I do want to clarify a policy question. Since that tends to be a bit of a burden addressing policy, I thought I'd bring along [Indiscernible] to help carry the load. So what's -- of these two llamas. This picture is taken at Chicago O'Hare Airport. The reason there there is the big, open spaces around the airports tend to attract wildlife. A lot of burrowing animals that in turn attract foxes and coyotes and birds of prey. And birds of prey and planes for example are not a good mix. So airport authorities have to address that concern by keeping the grass short. Which is less attractive to a lot of that wildlife and makes for a safer environment for airplanes. So the airport authority at O'Hare received a pilot

grant and they put some llamas and goats and other herbivores to work. In keeping that grass short. So what did we find was that? What is the analogy? The analogy is that instead of paving over, using herbicides or equipment to keep the grass short, they use llamas, which avoided that heavier environmental footprint. To achieve the same endpoint with a lower environmental footprint. That's what we're looking at doing in remediation. Getting those sites cleaned up and ready for reuse with a low environmental footprint. So could we go to the next slide, please? That basically is our challenge. Our challenge is looking upstream from site reuse, looking at the work necessary to get those sites ready for reuse, and in addition to building sustainability, we want to actually get that site ready for reuse and achieve that work with low environmental footprint. So the definition we have for Green Remediation, which equates to green cleanups, response actions, several turns out there for it, I think green cleanups is the one that has taken root, is a practice of considering environmental impacts of remedy, incorporating options to minimize the environmental footprints of cleanup actions. Okay. Let's go to the next slide. What exactly is environmental footprint? We've broken it up into a series of core elements. The ones you have on your screen, to help us use a common language to describe what it is we're hoping to achieve through our footprint reduction efforts. And also to better understand where we might focus our footprint reduction efforts. So these five core elements are broken across energy, air, water, land and ecosystems and materials and waste. What does this look like on the site? Let me pick an example on the energy side. Many of the sites we clean up in Superfund and other programs are often located in remote places where there may not be utility connections. To power systems. Top rate pumps unnecessary, maybe security systems, maybe monitoring systems. We often find we have to provide diesel generators or other power sources out there. And actually truck in the fuel to keep those guys running. All of that has a significant environmental footprint and energy use, water, area emissions, et cetera. Now with changing technology, we're finding that there are a lot of providers who have either solar or wind power generators that meet the same need of providing power remotely without us having to run those generators and truck that fuel out, so we're able to achieve the same endpoint of powering the remedy systems or monitoring systems or security systems but with a much lower environmental footprint. Another example may be on the water side. Water core element. Many of our treatment systems either require large amounts of fresh potable water, or may generate a lot of water, for example pump systems, often we have to extract groundwater as part of containment or treatment of a source area. Treat that water and dispose of it. Historically that water has often gone to publicly owned treatment water facilities. Additionally, some of the operations on the site may have impacts on surface water quality, not unlike any construction site. So what we see here is for example an opportunity to use some of that extracted and treated water for on-site operations such as preparing compounds for -- treatment compounds or for irrigation, dust mitigation, a lot of on-site activities. We are thereby reducing the use of fresh water while at the same time reusing a resource that's been generated on the site. With respect to the stormwater management on the site, that is an example of how Green Remediation often borrows best management practices across those five

core elements from other sectors of our economy, society. Let's go to the next slide, please. The idea here is that we are adopting and borrowing a lot of those concepts to use in a phase of a site's life that historically they were not always applied to as extensively as they could be. And that is getting the site ready for reuse, by cleaning it up. So let's look at two examples that we have here. The first is a site called California Gulch. It's in Leadville, Colorado. The cleanup objective at this site was to address metals contamination caused by past mining activities on a large 16.5-mile, square-mile site. These were to be addressed by minimizing human exposure to heavy metals, minimizing erosion of fluvial mine waste, which is in this case the upper Arkansas River, controlling leeching and migrating metals, reducing toxins and plants and reducing exposure of wildlife and livestock to heavy metals and soil and vegetation. Should note that this site is located above the 10,000 feet so it has some challenges of its own. The overall Green Remediation approach at this site was based on minimizing excavation and off-site disposal of contaminated soil through in situ at -- application of soil amendments. There are a lot of BMPs or core elements addressed such as fuel use, transportation, et cetera. Also by choosing soil amendments consisting of biosolids, car and go to -- agricultural products rather than synthetic products, [Indiscernible] to restore soil quality. This by the way is one of the questions that one of the participants asked earlier because Christopher Anderson -- in this case we did look at the use of natural source materials for the remediation and we've heard earlier that they have also been sourced for building the Green Infrastructure and that is definitely one of the common areas. Looking at best practices regardless of whether you are implementing remediation or whether you are building a Green Infrastructure. Okay. Another practice was minimizing additional disturbance to the soil profile and salvaging existing vegetation. Or integrating remediation processes with restored use of land for agricultural and recreational purposes and by wildlife. So in the picture, what we see in the top right, is basically stabilized riverbanks along the Arkansas River where they use native grass species that can rapidly restore groundcover after remedial activities. And that required little or no future maintenance such as mowing, irrigation or fertilizer application while meeting site reuse needs. What we see there are two roads of Sage and Willow, that some -- were supported by the [Indiscernible] along the Arkansas River. On the second picture, from a site called Elizabeth mine Superfund site in Vermont in EPA region one. The cleanup objectives here would restore the [Indiscernible] and water resources further downstream that have been negatively impacted by acid rock drainage resulting from runoff passing through waste rock created by historic mining of iron sulfide copper. Both these sites are mining sites. Part of it is coincidence, part of it also is a lot of Green Infrastructure related BMPs are commonest type of site. This site, by the way there was a very comprehensive Green Remediation strategy that addressed all five core elements of the reduction. I'm not going to go through all of them but I do want to point out that the implementation of the strategy merited the project's receipt of the 2014 Green dream team award under US Army Corps of Engineers sustainability award program. What we see in the picture here, though, is sediment control through the use of biodegradable seed erosion control fabrics made of agricultural

byproducts. Again, an example addressing the question that purchased and had earlier. This was installed along the cap perimeter, to control sediment runoff and contain and filter stormwater rolloff prior to gradual subsurface infiltration -- infiltration. In this case what we have is materials and waste core element using recycled materials to address water BMP, but really what I wanted to point out here is that implementing these practices, doesn't matter, we're building a remedy or implementing a Green Infrastructure. We're trying to achieve both of those with a lower environmental footprint. Okay? Next slide, please. So we started looking at these concepts of greener cleanup and best management practices, et cetera, about five years ago now. Early on, we identified a challenge of helping project managers in identifying best management practices and having the thought process to see like the ones that are most applicable to put in place a site regardless of the regulatory framework under which they are working. Superfund, Brownfield, corrective action, storage tanks, et cetera. After a lot of thinking and discussing amongst ourselves and outside parties, we determined to best approach was to work with a standards development organization. We finally settled with ASTM international and ASTM brought together a large group of stakeholders, representing site owners, federal and state regulators, municipalities, construction engineering firms and others to start working on the standard guide, which after a lot of work was finally released in December of 2013 and is out there and being used. By the way, the agency stands and supports implementation of the guide across cleanup programs. There is a policy memo to that effect. The standard guide, it codifies best practices and defines the process for using environmental footprints. It includes over 160 best management practices. It is program neutral as I said. It's a very use -- protocol for cleaning purposes. If you want -- greener cleanup principles, ask them to have them consistent with the ASTM standards guide and you will be way down the road. How does it work? Basically, when Green Remediation goals and cleanup project have been identified, by the client, either contractual requirement, maybe a regulatory requirement, whatever it may be, using the guide, if we have a small cleanup project or standard cleanup approach like it is just digging and Hall, we can go straight to identifying basically, screening and identifying applicable best management practices and selecting and identifying those that best fit. If we have a larger more complex site, we may conduct a quantitative footprint which helps us prioritize our footprint reduction projects across core elements and better define the best management practices that get us there. We select them and implement them. So what we have been doing, a lot of training on the standard guide, next slide, please. We've had several webinars since its release. We expect to have one in the near future, very well attended, we're also taking training to our project managers within the agency. And we've had training for states in EPA region five and region one, just last week, we had the region seven states, around Kansas City. And a lot of those webinars as talked about are available on our website, Green Remediation. You can find them elsewhere, but this is one URL that has all this information on it. [Cluin.org/greenremediation](http://Cluin.org/greenremediation). Some policies and strategies we described including the agency's read -- position with this -- respect to the standard guide and links to the standard guide itself. So that's about all I wanted to talk about, relationships between Green Remediation

and Green Infrastructure. A couple examples of how it's put in place. And then a resource you can use for implementing greener cleanups at a project. Always remember this is moving upstream a little bit as we're getting ready to implement the remedy. I want to think about how we can implement that remedy with a low amount of footprint before we move on and do the redevelopment using Green Infrastructure.

Okay. Thank you, Carlos. We have a couple questions for you. Someone has written in, have you thought of putting host remediation requirements into the ASTM guide, like groundcover that doesn't need mowing often and things like that?

That's a good question. One of the big challenges we have was defining a scope around a Green Remediation analysis. So what types of activities and what is the activity, the temporal and spatial boundary of the Green Remediation application of the standard guide? There is flexibility in the guide in defining those -- in the scope as including activities that are related to the reuse or do -- redevelopment or both temporal, in other words not just during the operation of the remedy but after and also spatial. We may be concerned about off-site activities if they are -- if we are directly affecting the footprint through off-site activities. So yes, to answer your question, the standard guide does allow for consideration of spatial and temporal activities beyond remediation which could include include redevelopment.

Okay. Another question is someone is wondering whether this is applicable in an urban setting or is this just for rural areas?

No. This is very applicable in an urban setting. I pointed out my two examples were for mining sites. Only because of the Green Infrastructure link, it's easier to make just because of the scale but a lot of urban areas especially air quality, the use of the government and how we power systems, there are a lot of BMPs that are much more applicable to an urban environment.

Okay. We also have a question about ecosystem services. What are we doing with that? Are we identifying, measuring when we engage in these kinds of activities and sites?

Good question. Currently the standard guide when it comes to ecosystem services is based mostly on qualitative description of what those are and mitigating or reducing impacts on the ecosystem services that are available at the site. Within the Superfund we are currently looking at a more structured approach to understanding ecosystem services available at that site so that we can better identify how we are impacting those ecosystem services and what BMPs may be available to reduce our impacts on those so very good question. Exactly where we are right now. Our next step in building the core elements.

Okay. What would you say generally? We're not talking sites specifically but about the cost of using green and biodegradable materials to do remedy work? Would you say we're spending a lot more money? Saving a lot of money?



It's not a comprehensive statistically significant analysis, but the evidence we have so far is that this is not resulting in cost increases and implementations of remedies.

Okay. Great. Actually we have a question, maybe you sent this in, Carlo. If people want to no more, if they want training about Green Infrastructure and Green Remediation. What would you suggest?

I didn't do that, but certainly -- I didn't send the question in, I did provide the link to [clu.in.org/greenremediation](http://clu.in.org/greenremediation) which is an agency website. Through which we are having the webinar. That's the place to go. Now, I certainly identify a lot of opportunities to work with you guys going forward. And I think that question -- the participant asked about the plummeting some of these practices. Building Green Infrastructure, there might be opportunities to leverage the work that both of these companies are doing.

That's great. We're going to move onto NXP your. Thank you, Carlos. I'd like to turn it over to Douglas Reid-Green.

[Indiscernible -- multiple speakers]

We can hear you. A real quick time check. We have about 55 minutes left.

Okay.

Go ahead, Douglas.

My name is Douglas Reid-Green. I work for BASF Corporation. I'm going to talk to you about the Landia Superfund site and how we integrated Green Remediation and sustainable development into the program. The Landia site is made up of two parts. The Landia property proper, which was at the East, and a fertilizer manufacturing facility that took up the bulk of the property to the West. Before we get started, I'd like to define what we used, what we at BASF use as sustainable remediation model. It goes back to the early discussions about sustainable development. We tried to incorporate environmental ecological and social benefits into our work. Sometimes more successfully than others, but at the Landia site, I hope to be able to demonstrate to you that we were able to bring about a truly sustainable and -- end to the project. And so when we talk about the different pieces, we'll try to fit them into these three balls. So to begin with, to give you a feel for what we were up against, the site had been used for approximately 50 years and the production of pesticides and for the -- fertilizer blends. The soil and groundwater were contaminated with pesticides and nitrates. The soil contamination was a problem because not only was the environmental impact -- there was also an impact on the local business owner who wished to expand his for to lecture -- fertilizer business. It also was an eyesore for the community. Look at the lower picture, this is what many of the community saw as they drove past the site. And the ecology of the site consisted of compacted earth, some weeds, some concrete so did not provide very much ecological benefit. Back in

2007, the group and the EPA agreed-upon the cleanup plan, which focused on the direct content -- elimination of direct contact for the pesticides, prevention of migration of the contaminants from the soil into the groundwater, and then in order to accomplish these goals, estimated removal requirement of 25,000 cubic yards of soil. In 2010, the EPA asked that that volume get extended to the groundwater, so that increased the volume of soil to be addressed significantly. The conceptual site model that -- put together for the site showed that there was a significant problem of infiltration causing migration of the contaminants from the soil into both what we call the water table zone and the basal zone of the aquifer. When BASF joined the group, we started to ask questions about was there a better plan? Could we do more with the site? And get a better result than strictly by removing the 25,000 cubic yards? And we started to look at the concept of bringing -- using federal remediation and the Green Infrastructure concept to produce a more holistic outcome. So fortunately, we had a receptive EPA team. And working hand-in-hand, the group and our EPA team developed -- reevaluated the site and determined that there may be a better way to handle the problem. One major component of that, there was a very significant redesigned soil investigation program that we put together that truly gave us a very strong picture of the distribution of the contaminants. And how they interacted with the site. And the stormwater at the site. It was agreed that we would extend the expectation where practicable, to the water table and even below the water table where we found the highest concentrations of contaminant. We also identified that the particular shape of the site was such that it molded in exactly the wrong location where the majority of the contamination was found was also where the majority of the stormwater infiltrated. So we redesigned the site in order to minimize infiltration of the stormwater. And to develop a site that -- a campaign plan that would then allow us to plant it in a way that was supportive of wildlife and help manage infiltration. A portion of the site was also capped with an impermeable cap to allow for the fertilizer company expansion plans. And then we are currently wrapping up some restrictive covenant issues in order to protect the integrity of the cap in the future. So this gives you an idea, each one of those little pixels was a sampling location. Each grid had to five samples recovered from it and the average concentration of those five were used to identify the concentration of contaminants in the areas. And then we used those to optimize the excavation plan in order to achieve the maximum removal of pesticide mass. And that allowed us to actually reduce the volume of soil that needed to be removed while increasing the mass of pesticides that were taken off the site when compared to the 2007 plan that we were working with. Then the fun part was on top of that, we were able to then produce a capping systems that reduced about 5 acres of habitat. At the same time reduced the amount of infiltration in the area. We installed a small amount of impervious cap to allow for business expansion and a stormwater management area where the retention pond that was built into the ecology to provide appropriate stormwater management for the site. Before I get to this slide, let me back up one second and tell you that the results that we've seen are such that we had originally had a contingent remedy that would include oxidation injections, however, the results of the source removal and the stormwater management have been such that we

have met the goals for the shallow groundwater and we are seeing a remarkable recovery of the shallow system at the site, which was the goal of the source removal and capping system. So ecologically, it's been from an environmental standpoint, very successful. We have met the goals of management, have direct contact and also impacted the groundwater. From the ongoing source. So that part of it's been successful. We've also been able to develop a capping system that over time will mature into a nice central Florida ecosystem. That will bring value back to the community. It supports a variety of wildlife. I believe we're at 77 different species of birds so far on our level site. We've improved the stormwater management for the area, which allows the neighbor, the fertilizer company, to expand its program. And so they're in the process of preparing to almost double their facility and bring jobs into the community. And so in the future, we expect to see a wooded area that will provide a much more attractive green space for the neighbors than the previous Vista that they had. So when we talk to our neighbors who had originally been a vocal force, for moving the project forward, they have now become very supportive of the work that's being done at the site, and have been a successful partner with us in getting this project done. So from a sustainable redevelopment standpoint, once again we've created a habitat that meets the needs of our current business owners, so they can now use it as open space under the local rags to allow them to expand on their property next to hours. The community has replaced an eyesore with green space. The EPA has -- the group has made big strides towards completing what has been a recalcitrant site because of the difficult nature of dealing with pesticides. Again, manage all the direct content contact risks and many of the risks associated with migration to groundwater. And we were fortunate enough to receive an award from the EPA for this work, which goes a long way to helping us. Internally, sell similar sites, similar activities, within the corporation, because nothing succeeds like success. So if we go back to our original model that we talked about at the beginning of my presentations, we talked about the idea of bringing benefit to the environment. And I think we successfully demonstrate we eliminate direct contact risks, manage the source to shallow groundwater, provided an ecology for wildlife. We have also had social benefits, community now has a much more pleasant scene to get greeted with, than the old buildings and facilities that was there. And we have the economic benefit of the expansion of the local business and job creation. So we do see benefit in all three areas. That we were hoping to see. And again, we were very pleased to receive the award for excellence in site for use for region four. And they were kind enough to come down and provide us with recognition and allow the local politicians to gain some benefit from the work that was being done as well. So hopefully, this has led us to, in BASF, to look at how to use these same concepts on a broader scale. And we are in the process now of a pilot program where we've selected eight sites throughout the Atlantic flyway where we are going to be bringing the concept of ecological restoration to each of these sites in a way that will be beneficial to the communities in the area, both from an educational and green space -- it will provide support for migrating species, both pollinators and birds. And hopefully will be the start of a growing set of natural corridors that BASF is looking at. We're fortunate

enough to have most of our sites either at long -- either along the Atlantic or Mississippi flyway. So we are planning to bring this program to all our sites, both those that are undergoing remediation and are active sites. So I'd be happy to answer any questions if there's anything --

This is Melissa. Thank you very much for that presentation. Actually we do have a question for you. I think you've touched on a little, and people are very interested in what we're calling a sustainability plan in your business model. It sounds like -- that would be great. And noticed the difference or somebody said this really makes a difference in the bottom line.

Yes. BASF actually was one of the original companies to sign the global compact with the UN. I don't know if it's because of our German parents, or just because of some forward thinking people, but it is part of our culture, sustainability, both from a pure business model, and from a remediation standpoint. We believe that it is critical to what we do and this happens to be our 100 50th anniversary. So they must have been doing something okay. But everything we do is put through a sustainable lens, because we believe that it is the only way that we can stay in business, is to be part of the a sustainable future. Part of that, for me, being a remediation specialists, is to bring more value to the work that we do. And we've found that in doing so, commonly we can get , through creative using Green Infrastructure, using sustainable remediation, that the cost of what we do actually goes down. The value to the environment, both from the remediation and from the redevelopment increases. And it makes the people working for the company excited, because at the active sites, they get to bring projects forward that get funded and get integrated into our site plans, so we have people, we have one place where we have a camera looking at Sturgeon in the river. We have another place where we support several places where we're supporting pollinator plantings. Some of them are small-scale, some of them are larger. We are having community gardens that are both on-site and in the community themselves. We have a site here in New Jersey where we've teamed up with Rutgers University and the -- one of the local churches to develop an aqua tonics system that is integrated with a program we're working on for the remediation of the river. So there's a lot of different ways to look at sustainable issues. But we believe and we're seeing that it is critical to success in our business .

Okay. Great. We have another question for you and then I think we'll do this one and move on to our next presenter. Someone has asked, does the fertilizer company still own the portion of the property with the ecological restoration? And if so, does the company pay property taxes on this portion of the property?

They actually have not owned it, but I don't know if they pay property taxes or if the group is paying the property taxes. There are property taxes being paid on it. But an agreement was made to allow them to use that as part of their site. So if their site became inclusive of that area for redevelopment purposes, which allow them to recalculate their impervious surface percentage and allow them to do more expansion on

their part of the property, so it's not been taken out of the tax rolls, but it also supports the redevelopment.

That's great. We actually just had a follow-up question which is, were you able to calculate the volume of stormwater runoff that's now managed by the restored site?

I have not done that, no.

All right. Great. Thank you very much, Doug. We're going to move on now to Rose Marie Caraway. Rose Marie?

Hi, everybody. My name is Rose Marie Caraway and I work as a Superfund project manager in EPA region nine which covers California, Nevada, Arizona and some of the other Western area. I'm going to talk to you about the Pemaco Superfund site located in Maywood, California. Now, the site is part of our Los Angeles Greenway project or it became incorporated into the Los Angeles Greenway project. Mainly because the Greenway project purpose is to provide Recreational Amenities, in the city of Los Angeles or along the LA River. Riverfront. The Pemaco Superfund site is located in underserved communities. We were able to incorporate Green Infrastructure elements to manage stormwater and the aesthetics of a public park. The other thing that we ended up doing as part of the remedy is also to incorporate both solar panels into the remedy and then also thermal heating as part of our remedy. So I'm going to go ahead and see if I can move forward to the next slide. So can you move the slide for me? When I'm doing it, it's not working. Thank you. The Pemaco site is in Maywood, California. It's a 4-acre tract of land along the Los Angeles River. It directly abuts the LA River. So what you're seeing here is the site, probably about in the 1950s, if you will, next slide, please. It's a custom blending facility in city of Maywood. It operated from 1940s until 1991. In 1993, we were actually asked to look at the site because a fire destroyed the warehouse in 1993. In general, the site carried or had 31 underground storage tanks, six above ground storage tanks and over 400 drums on site. The EPA investigation detected hazardous chemicals including chlorinated solvents, aromatic solvents, petroleum hydrocarbons and flammable liquids present in the soil. Then we had dioxane present. In general, the volatile organic compound, we had emissions in both the soil and groundwater. This picture shows the former warehouse building after the fire. Another reason why it came to EPA's attention is because there were children playing on the site and so a city official actually ended up calling our emergency response team. Next slide. In 1997, we did removal, so we implemented measures to stabilize the site. We raised all of the infrastructure, which you see on the left. Then we removed the remaining storage tanks, which you see on the right. This is one of my most favorite pictures of the site. It shows how large the tanks were. We installed the vapor extraction system and treated 144,000 pounds of soil vapor. We expanded the EPA site assessment and that resulted in the site being listed to the national priority list. Our final remedy for the site was selected in 2005 and included lots of community outreach and a public comment period. The public comment period was extended for a fairly long time, about four or five months. Just to accommodate all the questions and concerns that

were raised by people in the community. Next slide, please. So this conceptual site design if you will is a design of the park. The city of Maywood and the trust for Public land has started talking about implementing the park within the city of Maywood. And the discussions were to revitalize the industrial lands along that LA riverfront. Into the community. In general, there were about 6 acres of land or eight properties, sorry, eight properties that were in that particular area. So if you're looking at, from Alamo Avenue up towards the river, there were a number of industrial properties. If you look across the street from 59th place, those are residential housing. So what we had in the city was residential and directly across the street, a normal kind of neighborhood environment if you will with industrial lands. The purpose was to actually turn some of those industrial lands into recreational use. So EPA worked with the city of Maywood, the trust for Public land, California state coastal Conservancy, California state control Board as well as local and elected officials between 1998 and 2005 to look at plan uses for the site. The future site was definitely going to be recreational reuse and that was considered in all of our EP activities. That's why we were doing the remedial reading -- investigation, sampling, risk assessment, remedial design and construction. We even had our risk assessor look at the EIR plan for the site as it was being developed by the city of Maywood. So EPA staff and contractors worked together to come up with a conceptual design. They did their design, I had our technical staff look at it and see if there were issues or concerns we might have about the design and we would discuss those in meetings we had with the city and some of the planners associated with recreational use. So let's see. Construction of the remedy began in August of 2005. It includes the installation of the underground extraction Wells, vapor extraction wells and underground piping that would transport both of the groundwater vapor to the treatment plant. What you see here is one of our trenches for taking the piping, the treated -- contaminated water and vapor back to the treatment plant and the treatment plant hasn't been built yet. But it's going to be across the street from that orange and white building that you see in the background of that photo. So these photos are from the eastern trench. 10,000 feet of pipe was laid in the trench to the treatment plant. So next slide. Here you see the trench network was then covered with a liner and a 1 foot soil cover which is about 17,000 yards of soil. If I was going to -- one of the things that might be a little bit different here is the consideration of where to place the treatment plant. So we're placing the treatment plant in this case, the decision was made to place it at the end of the park or where the boundaries of the park would be instead of right in the middle of the park. Where the plant was located originally, it would have been smack in the middle of the park. There was a decision made to actually move it so it was on the edge of the parkland. So next slide. We completed the construction of the treatment plant in early December 2006. Registered the placement of the groundwater plant to best accommodate the park. 2007 investigation confirmed that the subsurface contamination from the site was not impacted indoor air quality of the home. One of the things we did during the ROI process was to actually sample indoor air, and ambient air in the neighborhood surrounding the site. We knew what the issue was and it is LA, so what we determined was the outdoor air quality was actually worse than what we were

getting indoor. It just showed up in the sampling as we did indoor air. In general, one of the other things we talked about at the site was actually installing solar panels. So I think it's really important to point out when this particular plant was developed, we were at the beginning of consideration for both looking at green Superfund sites - - so for us, we looked at the solar panels, they were installed in July of 2007. In general, they produced or -- it's a 3.4-kilowatt solar system at the treatment plant. It's probably equivalent to what you would see on some of your homes. It's not set up as a large solar array if you will, but in general because of what we're doing there, we were offsetting about 3.3 tons of carbon dioxide per year. When we saved about 2.5 acres of trees and 7600 car miles. So I think the purpose was to actually show that we could utilize it, that we could utilize it as assistance to the treatment plant, but it wasn't what we've seen now in terms solar panel actually being fully utilized and having more space or more solar panels. Next slide. So we're looking at the Maywood Riverfront Park as it's being developed or further along. An earlier slide show you all the dirt where we were putting down the cap cover, if you will. What you see here in the picture is the guys are working on the actual implementation of some of the infrastructure for the park. In general, I think what's important is because we were meeting consistently with the city officials and then coordinating meetings where if I was meeting with contractors and we would meet with the city designers, is that we came up with a decision to actually start the construction of the remedy and park at the same time. So in the image on the left, you see that infrastructure. And then on the right, you see our gate to the LA River. So this particular gate on one side of it, you see the park. You're looking into the park and this is out on actually the -- the picture is being taken from the LA River walkway. So the park offers a number of amenities to residents. Soccer fields, playground equipment, handball courts, basketball courts, and the Los Angeles River bike path. The bike path goes alongside the river front from various cities. It's only at the time this was built, there was only one park in the city of Maywood. It became the second park. And since 2008 when we opened it, they opened a couple of smaller parks since then. So this is the impetus to really, really help with the needs within the community to actually have more green space. It's become integral to these living residence in the area. It's in constant use. And the city of Maywood is moving forward to actually continue to buy land. The other thing that happened is after this was built, the soccer fields turned out to be extremely well used. So there's a need for more soccer fields and handball court was put in after the fact also. So then there is still more land left at the park for redevelopment. Unfortunately, the city got caught up in the state of California, when we took a way to redevelopment agencies. So there's still more parts of the land that needs to be redeveloped and I think they are working on trying to figure out how they're going to fund it now that they've lost the redevelopment money. Next slide, please. So I thought I'd show you a couple of pictures of some of the park to get you -- some of the images for the city. On the left, you see the middle picture, you see the kids playground. On the right, you see a walkway. To the left of that Greenbush is actually where they actually built some handball courts for residents. If you go to the next one, next slide, we have picnic pavilions and walking paths. So there's pathways

through the parks. In general, what we're seeing in terms of use is lots of families utilizing the park, specifically on the weekends, during the summer months, there's a lot of use also because the kids are home. You also see a lot of use where there's discussion, how do I put this, arguments between kids and quote, older kids over the use of the soccer field. Some of those older kids actually happen to be adults. Next slide, please. Again, basketball courts to be right. This one shows a couple of views again, of the pathway that was within the park. Next slide. So there's a sense around -- a fence around the park. If you look at the image on the left, this time you are inside the park looking out at the LA River. The LA River, for folks who don't know, is actually a concrete kennel and is part of the city. So when you walk through that gate, you are on a pathway that you can ride the bike along. Then the drop-off is the LA River channel, if you will. The image on the right actually shows the bike path itself. And I guess it's showing that we've gotten a lot more growth on that park over time. Now, next slide, one of the things -- I just kind of showed you the broader amenities of the park. We want to point out some of the Green Infrastructure features. They've just been integrated into the park. They're naturally direct and clean stormwater. To prevent erosion, and reduce the need for more expensive infrastructure elements, so that was built into the park design, the image on your screen is from 2006. That's in the beginning before the planning was more established. So a lot of those trees that you see there in that picture that are looking like six are very healthy tree growth over since 2006 when we opened the park. Next slide. Again, we'll have landscape burn. On the other side of that tree is a burn. That's a break between your open space and then you're slowly going over land and capturing some of the stormwater and two directed channels. So these berms direct water away but also provide a sense of privacy while you're inside the park. When I was talking to folks about getting this talk -- getting this talk, one of the things was for this particular site, a lot of what we were doing is stuff that would happen if you were designing the park itself. The monies for the design of the park, just to clarify that, were separate funding. So the actual construction of the park, implementation of the Green Infrastructure and so forth, was paid for by redevelopment monies through those other organizations in addition to the city of Maywood. But the discussion in terms of where pathways was kind of in line with EPA, because we actually have within some of that green space, along some of those pathways, we actually have groundwater wells. There are groundwater wells within the park and when we're sampling we're actually sampling -- spending at least a day or two in the park when we are doing some of our sampling. Next slide. Here again, bioswale. So the stormwater again is directed by the Burns into these vegetated bioswales. That flows the water transport and then reduces the potential for erosion. I think one of the things that we're seeing is the growth here in the park has been really, really well maintained and this vegetation has grown a lot over time. So the only issue that they have I think in terms of if you're looking at it as an intercity park and if you're going to do soccer fields is trying to figure out a way to make sure you could handle heavy use. So the soccer fields themselves, sometimes maintained green and sometimes they don't because they are being so heavily used so there are times when a city actually has to close them so they can allow grass on the



ground. So next slide. If I was going to look at this from a Green Infrastructure summary and I looked at some of the things that we talked about earlier in terms of improved stormwater, increased recreational activities and revitalize the site ecology, for us, we've looked at improving the stormwater, so we have stormwater retention built into the system, but mainly also through landscape berms and the bioswale. In terms of increasing the Recreational Amenities, we have trails and greenways, so you have the park connected to the overall County Greenway so that people can ride their bikes along that trail way, if they want to stop and rest I can come in to the park and sit on one of the pavilions. Some of the areas in the pavilions of people actually cooking so there's also the ability to actually utilize -- I'm sorry, I'm losing -- overcooking food -- they are able to cook in the park, if you will. In addition to that, the spaces themselves include athletic -- in the field or the ability for the kids to play soccer and then we have the handball courts and then we are restoring the community's connection to their urban Waters. And we would say urban waters, I would say that for them, it's the ability to walk outside your door especially homes across the street, and then actually be in a park environment. So one of the things that I guess we didn't talk a little bit about is watching the neighborhood change as the park was being developed. So you saw redevelopment also in some of the homes across the street as people tried to make the homes just a little bit more aesthetic or just improve the quality of the homes because now they have a park across the street. So there were times when we were right after the build where you saw a lot of redeveloped or I saw a lot of redevelopment of some of the actual structures. So next slide. So if you have any more questions, you can talk to me or carry or rusty from the Pemaco point of view. I think I do want to mention though, in terms of looking at Green Infrastructure, we implemented Green Infrastructure here, but we also in terms of our remedy, we also used electrical resistive heating. So the vapors and groundwater that were collected and brought into the treatment plant, we used a thermal oxidizer on the site to actually clean them up. And then for the most contaminated soils, we did in place from -- thermal heating. So that land has actually become available to the city as of the beginning of this year. We removed all the infrastructure, I think November, December of 2014. Going into this year. So now, for the city of Maywood, there's a part of the park that's not developed yet. And so as soon as they got redevelopment money, they probably will move ahead with trying to implement the rest of the park development. So I think I'm done.

Okay. Thank you so much. We have a number of questions. So the first one is, where did the berms, channels and bioswales director stormwater runoff to? Is most infiltrated into underlying soil or stormwater primarily directed to a receiving water body or to the grace were system?

It's mostly into the swales themselves. And then into the sewer system

Okay. We actually have a couple of questions on stormwater. So let me try another one. Let's see. Okay. Is a stormwater runoff from the roadways and parking areas treated in the bioretention areas?

No. No. They're totally separate. What the city did was they redesigned that street. That street used to be a two-way street so it will accommodate the parking because we're still in an inner-city environment. So this is an urban environment. They've turned the streets into one way development. So it was more I think controlling of stormwater on the land as you're developing it. And then directing it to some of the street stormwater, issues, and then providing areas so that water can still infiltrate but not cause flooding on the land.

Okay. And we've got some more. What measures were taken to reduce stormwater infiltration to contaminated soil? Or was this not a consideration since groundwater is treated?

In general, we removed surface soil to contaminated soil in some areas on the land before the construction started. There was contamination within the 30-foot zone on the former Pemaco properties. And so for that, the soil vapor extraction system, so there are wells located there that can actually pull vapor and water and send it back to the treatment plant.

Okay.

Let me correct. The most heavily contaminated area, we did thermal heating. Which I didn't show in any of these slides.

Okay.

If we go back to -- the conceptual design slide, so I think it's like three or four -- sorry, page five. So if you look at 59th place, construction of the park is from 59th place North, and then where the circle is, where the circle is if you move to where the red circle is at where the B is, it's undeveloped from there down, downwards towards 60th Street. So everything North is developed. From there downward is not developed.

Okay. I guess a number of people have written in saying now that there's a drought in California that we're all hearing about, has that changed a lot at the park?

It's probably not helping the city keep the soccer fields from remaining dirt with a little bit of grass. In that sense they are trying to water the area. So I am not sure how -- Jerry Brown did a new requirement for those of us handling water in the last couple months. I'm not sure yet how it's going to impact the Riverfront Park. At what point we did consider giving them the water but it just didn't work out. Our water. But it didn't work out.

I'm going to just stop for a second because we still have to get through a few more things. Rose Marie, thank you very much. I want to thank all our presenters today. It was great to hear in-depth stories

about how Green Infrastructure strategies have been employed at Superfund sites. We found that throughout SRI's history, sharing stories of successful reuse projects is one of the most effective tools for promoting reuse. So these stories highlight effective tools and resources and they provide inspiration for those looking to reuse contaminated properties. And our presenters have done this today by sharing their stories and we very much appreciate it. I'd like to wrap up our time by just providing you with some resources. I'd like you all to take a survey and if we still have time, we can to our extended question and answer period. So just to get through everything very quickly, SRI has a number of tools and resources on our website. And I'd encourage you to check out the sustainability section, which provides specific information on incorporating sustainability tools and approaches including Green Infrastructure into Superfund redevelopment. So if you would take a look at that, on my next slide, every region has an SRI redevelopment coordinator to support reuse as a site-specific level. So if you'd like more information about an existing reuse project or you'd like to discuss exploring reuse opportunities for a site near you, feel free to reach out to your regional coordinator. We have the contact information listed on your screen, but another way to access this is by clicking on the SRI coordinator's link in your resources tab to the right of your screen. Okay? If you have any general questions about the material covered or you'd like more information, don't hesitate to contact me or Frank Avvisato and visit the website. What I'd like to ask -- ask Jean to switch of the slide view to the survey screen and I encourage you all to fill it out. We use your feedback when we consider future webinar topics. So feel free to let us know what topics you'd like to see. And impact of this webinar as a result of people saying would like to see a webinar on green info structure. If you add your e-mail address at the bottom left if you'd like to be on our notification list for future webinars? So while we're doing that I guess we can take a few more questions. Let's see. I hope you all are filling out -- great. Okay. We do have -- Rose Marie, if you're still there we do have a question, someone has asked, maybe building a park is not a traditional redevelopment. Was it hard for you to explain to people that this is what you wanted to do and that you weren't building a store or you weren't doing some kind of economic redevelopment? Did that enter into your discussions?

No. I think for us, it was more community members or but trust for Public land coming to us and saying that's what they wanted to do. I think where it became -- I had to be cautious as a project manager is to make sure the funds being spent by EPA work towards cleanup. And so we'd have to have meetings about that and have discussions about this part of it is cleanup and then this part is your responsibility because it's the park and had to be very cautious and implementing it so that you kept everything separate. But that required us having meetings and everybody being open about what their needs were.

That's great. I have time for one more question which someone is asking about native plants. Were they used exclusively in the park design?

I'm sorry. As much as I planned, I do not pay attention to that. I think they were. I remember us having a discussion about it but I'd have to honestly look that up.

Okay. All right. I think we're running out of time, which is really amazing. And I really appreciate everyone's participation. I want to thank you all for your questions and for joining us. I especially want to thank our presenters. And I think I'll turn it back over to you to wrap up.

I think we're ready to wrap up today's session with some closing slides from you.

Just a reminder, Superfund Redevelopment Initiative is part of a series. It's ongoing. Our next one is scheduled for August 13 from 2 to 4:00 p.m. We're going to talk about potentially responsible party perspectives on Superfund site reuse. And also all of the webinars that we have delivered in the series are archived and available at [CluIn.org/SRI](http://CluIn.org/SRI) if you -- if you want to learn about other Superfund redevelopment topics. With that, Jean, I think I'll turn it over to you -- let folks know how they can provide us with feedback and get more information on [CluIn.org](http://CluIn.org) webinars.

Thank you so very much. In the last moment that have with everyone, I want to remind everyone that all of the presentation materials can be found on the resources or links page. That URL is active from this point forward. If you happen to be one of the lucky ones replaying today's archive, you can follow the link under the related URLs to seminar resources where you simply click on the link I shared in the question box in the lower right corner. Either one will send you to the area where you can download copies of the presentation materials. We would ask if each of you could take a brief moment and fill out a short online feedback form for us. We do continue to read each and every one of your responses. And we depend on your feedback to help us continue these free online Internet seminars. One key thing if you share the line with multiple people, if you follow the link to the seminar feedback form, that's available from the homepage Oregon under the related URLs window, you might need to scroll down to find the link to the feedback form, but if you fill that out, there's two things I'll point out. Number one, you can fill that form out multiple times. When you fill the form out, there will be a link that appears to let someone else fill out the form themselves. If you happen to be sharing the line with multiple people, you can each take a turn and fill out your own feedback form. You don't have to share feedback. You can each give us your opinion. You can also fill this out tomorrow or later on today. That link will be active from this point forward. Also a number of participants use our seminars for CEUs, PDH or formal training requirements. While we don't necessarily issue CEUs or PDH, we do have methods for you to document your participation which you might be able to use to still earn credit for today's session. If you fill out that online feedback form, you'll notice there should be a box that appears on that feedback form. I've circled in red. As long as you check that box and correctly entered your own contact information, when you submit feedback you should receive an automated confirmation e-mail which

will verify you shared feedback after the live delivery. Usually if you have copies of the presentation materials and/or your -- registration e-mail for sharing feedback, that's enough to verify that you participated in the live event or replace the entire recording event. As I mentioned earlier, today's entire session was recorded. We will make that archive available in approximately one to two business days. Everyone who signed up including those of you who were stuck on the weight list will receive a link to replay that recorded version of today's session and you are welcome to share that with others who will find it valuable. I want to thank the nearly 420 individuals who joined us from all over the world for today's live broadcast. All of our presenters and organizers who helped make today's session happen. Thank you so much for joining us. This will be the formal conclusion for today's live broadcast.

[event concluded]