LANAI PLANNING COMMISSION
SITE INSPECTION
MAY 21, 2014

APPROVED 06-18-2014

A. CALL TO ORDER

(The Lanai Planning Commission assembled at the Lanai Senior Center at approximately 2:00 p.m. Pulama Lanai then transported the group to the proposed desalination plant site in the Manele area.)

The site inspection of the Lanaʻi Planning Commission (Commission) was called to order by Chair John Ornellas at approximately 2:25 p.m., Wednesday, May 21, 2014, at the proposed reverse osmosis 2 (RO2) site in Manele, Island of Lanai, Hawaii.

A quorum of the Board was present (See Record of Attendance.)

Mr. John Ornellas: So anyways, let's call this meeting to order, the site visit on Wednesday, the 21st of May. We call this, what RO2?

Ms. Lynn McCrory: Yeah, I'll talk about that in a minute.

Mr. Ornellas: Okay. If – we'll run it like a regular meeting so if you – if you have a question we'll do it – we'll open it up for the community and then for commissioners. So we have to make sure she's near by so that way she can record.

Ms. McCrory: Do we open it up for the community – if I'm looking at the agenda?

Ms. Kaiulani Sodaro: I don't think it is.

Ms. Richelle Thomson: No, we can have public testimony though.

Ms. McCrory: Yeah. We can take it.

Ms. Thomson: It doesn't matter if it's on there or not.

Ms. McCrory: Yeah.

Mr. Ornellas: Alright, so then let's – let's start with the – with Lynn, with the inspection, the site inspection. Be my guest.

Ms. Sodaro: Hi everyone. Court reporting. Alright. Kaiulani Sodaro with Pulama Lanai. Before we enter the agenda and its part I just wanted to have a safety check-in with everyone first. So, we are on an active construction job site. If you could just be mindful of where you step, look down before you take a step. We do have some open trenches. I just want to point the most obvious ones out. We are on an unlevel ground so just mind your stepping. So we have an open trench right here. Obviously the bigger one that has orange fencing. One behind this huge equipment you see here, and then a foundation. So I actually wanted to suggest that maybe we contain our conversations and meeting to this area here. So I just wanted to have

a safety check-in with everybody first. Thank you. Thanks Lynn.

B. SITE INSPECTION

1. PULAMA LANAI requesting a State Land Use Commission Special Use Permit and a Phase II Project District Approval for the Reverse Osmosis Desalination Facility and Distribution System including the development of reverse osmosis desalination plant facility, administration building, water generation facility, and related improvements within the Manele Project District at TMK: 4-9-002: 001 (por.), 4-9-017: 009 (por.) and 010 (por.), Manele, Island of Lanai. (SUP2 2013/0028) (PH2 2013/0001) (B. Sticka)

Public Hearing conducted on April 16, 2014.

Ms. McCrory: Alright. Thank you, and thank you all for coming on the site inspection for our desal facility. We're going to talk about – stop at a number of places. This first one is site no. 1. Our stop no. 1 is our source well no. 2 which is going to be the main supply well for the desal facility and it is right there. That's the well. Alright. And what you're seeing over here to the left of that well is where the pilot facility will come when it comes in. It's going to sit on that. So that's just in place at this point. There are three source wells that will be drilled, and we'll have for the pilot facility, you saw a white pipe as we were coming along on the right, that's where this water will go back over into source well no. 1. And that's how this pilot facility will function.

So, the next stop after this will be up to the desal site, the 14 plus acres where we will talk about the buildings, we'll talk about a whole range of different things for the facility. We actually have a sample of – what filters everything – how's that? And then the last stop will be the disposal well no. 2. And then we will exit back out to the resort and go back up. I do want to say a couple of things. We are going to – you saw a gate down here. As a normal course that gate is blocked at all times. We asked one of our staff to be there so they could open the gates and make us get it in, and he has locked it. So we can't go back, right? That's what I thought. So we can't go back that way.

So we want to talk a little bit with Tom and Steve. Tom Nance you know, and Steve who's going to be doing the water testing. So Tom, if you want to start with a little explanation on things.

Mr. Tom Nance: Let me bring it over so people can see. Essentially what we've drawn through here is a cross section through the island. And basically it goes all the way up towards town. And before you get to town, take a right, and it goes over the hale to the windward side including Manalei Valley. And it's a depiction of how ground water is situated and moves on this island. Amazing thing about this island is that a whole lot of your island has what's called high level ground water. That's the precious aquifer. And it's held up high because there are

numerous intrusive dykes which is when the . . . (inaudible) . . . lava gets forced up to the parent rock, cools in place, there's essentially impermeable compared to the parent rock, and is partial impediment to the flow of ground water. So as the rainfall recharge goes in it fills these compartments and the water successively slowly leaks from one compartment to the next down into Palawai Basin, ultimately into the basal lens near the shoreline that we're standing on, and discharge at the shoreline. These levels vary from as much as 1,500 feet above sea level, 1,000 feet, 800 feet. And when you get down into Palawai Basin, at wells 1 and 9, it's about 600, 650 feet above sea level. If you go to wells 14 and 15, it's been 400 and 500 above sea level. Then you come all the way out to the rim here, near that irrigation reservoir, there's a well 10 where the high level ground water stands 200 feet above sea level.

The unique thing about the ground water in Palawai Basin you'd normally for high level ground water expect it to be rain water fresh. It's not. It's brackish. And that's why this brackish water is used to irrigate landscape down here and the golf course.

A question was raised by one of the commissioners last time – a good question – how do we know we are in basal ground water? I'm – where we're sitting on this map is about here. The ground elevation here is about 365 feet above sea level. If we're in basal ground water, we're going to drill down through basically dry rock, unsaturated rock, until a foot or two above sea level and we're going to encounter water. So that's the first thing. Do I hit water standing 10's or 100's above sea level all screwed up. We should drill further makai we're into high level ground water. But the reality is we hit water a fraction of a foot above sea level when it was first encountered in the hole.

The second thing is we keep on drilling. This well is a total of about 515 feet deep. Ultimately going from 365 feet above sea level to about a 150 feet below sea level. And what we see in the water column as we drill down, there's brackish water in the basal lens, a transition zone from brackish water to salt water, and then salt water for the rest of way down in the well. So that's how we know what we've tapped into here is basal ground water and not high level ground water. Second thing is how do we know when we take that salt water from the bottom of this well, how do we know it's not going to impact the aquifer or even the basal lens? The reality is the proof is the pumping. When we start pumping this and we pump this well at 3,500 gallons a minute. If we're going to draw water either from the high level aquifer or the basal lens, what's going to happen is we start out pumping salt water and over time it will get fresher and fresher because I would have sucked this water into and become a portion of the water pumped. We pumped tested this particular well three times, at rates, as I say, up to 3,500 gallons a minute – the pump water salinity has been absolutely sea water salinity and unchanging through every single test.

The other thing we do is in this well while we're pump testing it, we have a water level recorder in the basal lens, down, around the outside of that case. So if I pump from down here, and when I pull the salt water down a couple feet, what does it do – what do the basal lens say when I'm pumping? Well, I have a recorder there to record, do the basal lens feel what's happening beneath it or does it not. And the reality is the basal lens, through the water level recorder says, I have no knowledge of what's going on. I'm hydrologically disconnected from

the salt water below the basal lens. So the proof is in the pumping, and the proof is in the fact that the stratigraphy that we drill through isolates the salt water from below from the basal lens up above. So that's on the supply well side.

The disposal wells, which we'll see after. These supply wells are nominally are going to be drawing water from between 50 and 150 feet below sea level. Pure salt water. When we get over to the disposal wells, they're going deeper. We're drilling those to 400 feet below sea level, and they will only be open from a 150 to 400 feet below sea level. So when we take the concentrate from the desal, put it down the disposal wells, it goes out into that very deep formation and then we'll move slowly to the shoreline. The concentrate that goes down the well will be about 1.8 times the salinity of the salt water receiving the injected. That makes it heavier. It's more dense than the receiving ground water. So that will make the water that's put into the formation tend to slowly sink as it moves towards the shoreline and mixes with the saline ground water. So there's an ultimately discharge several miles off shore and probably where the ocean bottom is . . . (inaudible) . . . 650 feet deep. So we've got a hydrologic separation, basal lens for supply wells, and another separation of state and depth between the supply well and the disposal wells so that after we've been operating for a few years we're not sucking back the concentrate and all of sudden the water we pump out of the ground isn't – pre water salinity start to rise . . . (inaudible) . . . We want to be able to pump . . . (inaudible) . . . water basically into . . . (inaudible) . . .

Mr. Bradford Oshiro: Where did you . . . (inaudible) . . .

Mr. Ornellas: Let . . . (inaudible) . . .

Mr. Nance: Basically I covered what I needed to cover. Any question will be fine.

Mr. Ornellas: So do you have a question, Brad?

Mr. Oshiro: Yeah.

Mr. Ornellas: Okay, please state your name because we're recording this, yeah?

Mr. Oshiro: Okay. Bradford Oshiro. I'd like to know what you guys did with the water that you pumped out of the ground so far?

Mr. Nance: That has been disposed of. The test water it went over the sediment basins and slowly sunk. We didn't overflow the sediment basins.

Mr. Reynold "Butch" Gima: Butch Gima. Tom, can you talk about the numerical or percentage validity of the pump test you did in the context of future pumpage where you may be pumping 20 million gallons a day to get 10 gallons per day of product water over a duration of time as it impacts the – the potential impact on the high level aquifer. Because the short pump test that you're doing now, I don't think you can get a real accurate conclusion on what impact it has on the high level aquifer.

Mr. Nance: The only way to say absolutely is to continue to monitor and to continue to watch what we pump, and to say that the salinity remains unchanged. We're taking water from an incredibly permeable strata down there. I mean, at 3,500 gallons a minute . . . (inaudible) . . . like that. And soon as we stop pumping the water is like that. So as long as that can continue and the only way to know that for sure is to watch the salinity as it pumps. And that will tell. If it starts to freshen basically that water has to come from somewhere other than the saline ground water body. Whether it's the basal lens above, or the high level aquifer.

Mr. Gima: You shouldn't put too much validity into to this current pump test given what you potentially will draw out of the – to be a 10 gallon a day.

Mr. Nance: I've made a number of salt water wells throughout the state, some of them operating for 25, 20 years, salinity remains unchanged. Now, they're not a 20 gallon a minutes – I mean – million gallons a day. But, we've demonstrated with that history all over the state that we can make salt water wells that simply just pulls salt water.

Mr. Gima: So we can take what you say to the bank then.

Mr. Nance: We'll watch the salinity over time.

Mr. Ornellas: Sally?

Ms. Sally Kaye: Yeah, Sally Kaye. You refer this is a pilot, and I'm assuming, or should I assume that that's because you're taking a little bit more, less than you're ultimately going to, but this is still going to be your, your source.

Mr. Nance: Yes.

Ms. Kaye: The pilot is just a way – you're just providing your process now. It's not a pilot that's gonna go somewhere else.

Mr. Nance: No, the pilot is a requirement of the Department of Health to demonstrate to them that the technology used for the desal will produce drinking water quality. So they have required us to make a smaller plant, same technology, run it, do all of the water chemistry and demonstrate to the Department of Health that we can produce drinking water quality. So that's what that's about.

Ms. Kaye: So this won't stay its size or it will be bigger or what?

Mr. Nance: No, no. It will do its job, running for 60, 90 or 120 days – however long it takes – that data goes to the Department of Health and the pilot goes away. And what you will see ultimately here is just . . . (inaudible) . . . in that well, the concrete blocker on that well, control building and so forth, and the water pumped from here will go up the hill to the plant site that is our next stop.

Ms. Kaye: So, so this . . . (inaudible) . . . is done.

Mr. Nance: Yeah. It served its purpose.

Unidentified speaker: It's a one-tenth scale model of one of the . . . (inaudible) . . . of the full scale plant.

Mr. Nance: Identical technology just smaller.

Ms. Kaye: Okay, so this control building you're talking about is then just going to service –

Mr. Nance: That floor pump.

Ms. Kaye: Okay. And that well pump is going to produce what percentage of the total that you're –?

Mr. Nance: Well, it's going to be producing about 2,200 gallons a minute, a little over three million gallons a day, if it runs 24/7. So it would be one of three in the phase one, all identically sized.

Ms. Kaye: Thank you.

Mr. Ornellas: Any more questions?

Mr. Steve Dollar: Okay, my name is Steve Dollar. I'm an oceanographer and I'm kind . . . (inaudible) . . . 30 years specializing and looking at the effects in the ocean in terms of water quality and marine life from activities on land. I started doing this when somebody got interested . . . (inaudible) . . . protect golf course as we've got 80 golf course within the state. Before we started looking out nobody really knew what was happening. Now we've got a really good handle. So I'm using the same technology that models the sampling methods we've developed for that kind thing over the years to look at what the effect or non-effect will be from this project, on or near shore ocean, specifically in Hulopoe Bay. So I think we're going to talk about this specific monitoring later. Is that right?

Ms. Sodaro: At the disposal site.

Mr. Dollar: Anyway, this is – this is a very nice aerial photograph, a satellite image of the whole area. We're standing – we're right here right now – and we're going to be going over here to the disposal site. These yellow lines – and we'll get back to these later – are places in the ocean where I have sampling stations set up. Like I said we'll talk about this later. But we've got three down sloped from the supply wells, and three down sloped from the disposal wells. And then we have controls over here – one here and one way over here that are down sloped from areas where there's nothing. And we call those controls because they tell us what's going on in areas that aren't detected by any activity. I think we'll hold off on the rest of this until later.

Ms. McCrory: Let me just get . . . (inaudible) . . . The other silos that you see are Dr. Brocks – Lynn McCrory – are Dr. Brock's testing sites for both water qualities and marine qualities – marine life. And these are the ones that have being done for about 30 years. You get the reports quarterly as a planning commissioner which then shows what those are . . . (inaudible) . . . But we wanted to show you all testings that's being done so you have some idea. Okay?

Mr. Ornellas: Butch?

Mr. Gima: Butch Gima. Can you talk about the base line data, how long – how long you've – if you've established base line data already and for how long. And what, what are you capturing in that base line data for your controls?

Mr. Dollar: Okay. Yeah, we have two increments of sampling done so far. We did the first one, I think, in November of 2013. The second was just before that last commission meeting we had in April. And the plan is to do this quarterly, four times a year. And that what we've kind of determined as a good combination of being frequent enough, but not too frequent to be able to take those changes. What we find so far is that looking particularly at these stations here, where they're down sloped from the supply wells. And I guess I got to back track and talk about how we do this.

We start – what these lines represents what we call trans sects. And what it is an imaginary line that starts at the shoreline and extends way out to here. These aren't to scale. These should actually extend out here into the blue water. And we take samples along that trans sect both at the surface and at the bottom, and we have instruments we use that we drop from the surface down to the bottom that continue to record temperature, oxygen, salinity, depth, so we can see what the profiles are through the water column as we move out here. And what we've found so far – of course none of this is in place yet so this is truly a base line. The background conditions before we start is that we see ground water coming in at the shoreline mainly at these two sites. We little here, but much less than over here. And this is the typical situation everywhere in Hawaii is that you see ground water, fresh water flowing from up mauka, down into the ocean, and you can pick it up right here at the shoreline. And depending on how much is coming in and what the condition of the ocean is in terms of mixing of wind and waves, how far out it extends, and how far deep it extends. So we've established – you know, we started on this base line. We'll be continually doing it four times a year until the project is in operation. And then once the project is in operation we just continue to see if anything changes. And like I said, we have these control trans that go up to here to be able to say what the natural background is. So, right now what we've seen is kind of what we expect to see. Some ground water coming into the ocean rapidly mixing in the near shores down here. By the time you get out here, where the water turns blue, it's ocean. Pure ocean, unaffected by . . . (inaudible) . . .

Mr. Gima: Thank you.

Ms. McCrory: Just one more thing on the control site. Lynn McCrory. They aren't in the first two reports. We added them because we wanted something that said if there was effect on the

ocean we could see that. And that it wasn't the result of the desal or something change in there. So the next report, the next quality report that he does, will set the base line for these far outside control functions.

Mr. Ornellas: Sally?

Ms. Kaye: Sally Kaye. So from here to here, this is your 14.95 acres?

Ms. McCrory: No. This is your 14.95 acres, up in here.

Ms. Kaye: Okay.

Ms. McCrory: Yeah, and then, just to give – there's a project district 2 permit that's also included in here, and that's because some of the pipelines will be crossing into the project district. So everything else up here is in ag, and that's a special permit. But, there are some pipelines that will cross in. So that's why that one piece was added.

Ms. Kaye: I'm sorry. Sally Kaye, again. That's a question I was going to ask at some point. Where's the rural piece?

Ms. McCrory: The rural is state.

Ms. Kaye: But where? . . . (inaudible) . . . designation.

Ms. McCrory: That's the designation. You've got rural for state, and then over that is county and that's ag. Or, as in this case, it's urban – in the project it's . . . (inaudible) . . . and residential.

Ms. Kaye: I thought most county zoning was interim.

Ms. McCrory: Not here. This all had to be done with Manele being started.

Ms. Kaye: Right, in the project district.

Ms. McCrory: In the project district.

Ms. Kaye: But, outside the project district.

Ms. McCrory: No, it's ag. I think interim is farther up, as I remember, farther up the hill.

Mr. Ornellas: Members, these two presentations so far will be in our packet for next month, next month's meeting. Yeah, I talked to Arlan and Arlan said he'll mention it to you. So we'll get to see those. And this is something new.

Ms. McCrory: This is new. The commissioners asked specifically to see – Joelle asked –

specifically see where we were testing along the shorelines. And she was also very specific about water temperatures. And you can see these in Dr. Brock's report, and you can see them in Steve Dollar's report. So if someone wants copies of them for where we are right now, we can also provide those to you.

Mr. Ornellas: Can you make it part of the packet that we get in June please?

Ms. McCrory: Yes, we can do that.

Mr. Ornellas: Thank you.

Ms. McCrory: Okay? Are we ready?

Mr. Ornellas: Any other questions – further questions? Anybody? Kepa? No. Alright. Members, do not converse between yourself.

Ms. McCrory: Kepa, do you want –. Excuse me, wait. Do you want, do you want to talk about the wall that they're going to see on right as we're driving up?

Mr. Kepa Maly: . . . (Inaudible) . . .

(The Lanai Planning Commission recessed at approximately 2:47 p.m. and reconvened at approximately 3:00 p.m. at the proposed desalination site, breaker tank 2)

Mr. Ornellas: So, Lynn?

Ms. Sodaro: Alright. So stop two, we're going to do a couple of things here. First I'm going ask Kepa to speak to one of the archaeological sites that have come up to discussion at our prior meetings. And we may need to – some of you could shuttle that way, but others, probably easier if you just stepped down here. Kepa is going to just give a brief history about this wall section here, and I'll then just give an oversight of our site plan. And then also Sam Cramer of IDE will go into kind of the specifics of this . . . (inaudible). . . desal facility from the reverse osmosis process. And then we also have a session of the . . . (inaudible) . . . membrane discussion so we'll do that . . . (inaudible) . . .

Mr. Maly: During the last meeting some discussion was raised about cultural and historic properties. One of the really cool things – and this side you can't see it, but if you're down here, you look across, by 1903, Charles Gay folks have been trying to engage and figuring out a way to improve the ranching operations on Lanai and protect grazing lands and things. In 1904 the territorial forestry division came out with a report on Lanai, actually recommending that, that the 10s of 1,000s of goats that were running wild be controlled, and that a systems of walls be built as part of the ranch operation to control grazing animals, such as cattle at that time. So, between 1905 and 1910, as the ranch ownership was changing a small hui as Gay was losing his, his title to the island, they engaged in a program of planning for. And then Hosmer was

here in 1910 who was really sort of the founding father of forestry and the vision. And they recommended a series of walls to be built. We started to go through the ranch records from 1912 up to the 1920s. So remember George Monroe built – grand uncle arrived here in 1911. Monroe implemented a process of building walls and fence lines dividing the entire island into a series of paddock. If I recall, I think there were 29 paddock total around the island. 13, 14, 15 here. So this wall that's off in the distance there was built 1905 and 1911, 12 period. We've just going through the original records of the ranch now that we've located in Honolulu, and actually getting some better dates on it.

What was really cool was when we were talking about this project and our crew was out with Tom Dye's crew doing the archaeology sort of inventory, or field work, just to check and see what might be available. You know the wall is clearly visible on Google satellite maps and things like that, and it becomes a fence line by where we cross through the road. We recommended that this be preserved and that there be no – and in fact the really good thing is . . . (inaudible) . . . is totally away from it. But what we've done is we've – our crew has gone ahead and flagged the wall. So it's a historic ranching wall. And I have to say if you compare it to wall work that people do today by, like, down at Kapihaa Village which was the most recent one – this wall has stood for over 100 years and it's in really beautiful conditions in most places versus the modern wall that was built and is filled with dirt and crumbling apart already. It's a beautiful sample of a historic ranching wall on Lanai. Finely built, very uniform based to an narrow top, flat, flat surface at the top. And so the walls been flagged just to ensure that people are aware of it. But there is no possibility that any activity from this project is going towards the wall. So the idea was just pointed out to you. I'll give you a brief background on it. It's just really cool, though, because you can follow it all the way around the island and see where these walls connect to provide at one time was the heart of the ranch operation from 1961.

Ms. Sodaro: Thank you. Any questions for Kepa? Okay. Thank you. So I'd like to orient all of us so we know where we are on the site plan. So we're essentially – this is our breaker tank that we're reversing. We're going to make it a booster to feed into the 15 million gallon reservoir. And that was part of a Palawai . . . (inaudible) . . . description that John had talked at our last meeting. We are here in the carve out of the parcel, so we wanted to get a feel what 14.95 acres approximately feels like. So this is – we can see the survey stakes up high. There's actually one on the road that represents the makai border of the property. But as we go up to the top of this access road, come on to the construction access road, you'll see the service pipes up. So if you just look for those so you kind of get a feel of what the site – outside site perimeter looks like.

So essentially a site has three tiers. You know, it's really a combining of water tanks. We have our generator building. We need the fuel storage components. So those are on these two bottom tiers. And then on the top tier which is right above us, mauka of the breaker, is where the – essentially the heart of the desal facility will sit. And so I'm going ask Sam to go through the pre-treatment component and get to demo.

Mr. Sam Cramer: Sure. Thank you. I'm Sam Cramer from IDE Technologies. We're a company that designs and build sea water desal plants. So the treatment process, the sea

water desalination treatment process is essentially comprised of three stages. The first is commonly known as the pre-treatment. The middle is the RO, or reverse osmosis. And the third section is the post treatment. And I'll walk you through briefly each one.

The heart and sole is a reverse osmosis process. It takes in sea water with a salinity of roughly 34,000 parts per million, and separate that into two streams. The permeate stream is a desalinated water which is a potable drinking water quality with a total resolve solid concentration of about 100 ppm and less. And then there's another stream which is the concentrate or brine. And that's a – all of the salt that were in the sea are moved into the brine and concentrates that. So what happens is the permeate becomes what we drink, and the concentrate is then returned into the disposal wells that we'll see next.

For the pre-treatment, the primary part of it is – in order to prepare the water to go into the reverse osmosis section and the purpose of that is a series of media filters primarily sand and . . . (inaudible) . . . filter that remove any suspended solids in the water so that the water is free of any particular matters.

The next phase is the, the reverse osmosis section. What you see here is an eight inch sea water reverse osmosis membrane element. There are – these are typically installed within a pressure vessel consisting of eight of these elements in the series. You can see a cut away section here. And essentially what an RO membrane looks like is – this is a spiral round membrane. Essentially it's a series of layers. One is a course, a courser textile material where the feed water, the sea water comes and enters into that course material. And the other layer is a membrane. And I think we have some sample of the membrane beyond you there.

Ms. Sodaro: No, no Arlan's got it. He's handing it out.

Mr. Cramer: The membrane material which is a poly ami membrane that's applied onto a poly silicone backing material. And those are arranged in a sandwich like configuration, and then rolled up into a spiral round – spiral wound configuration. If you look at the cross section of this you can see the, the permeate tube in the center where they permeate that you would drink comes out. And around it in the . . . (inaudible) . . . is the sea water feed. The raw water feed goes into the course textiles, passes through the membrane which is connected to the inside of tube. You can see a cross section of it. So we have pictures if you will – eight of these lined up in a row, connected to one another. And that's, that's the heart and sole of the desalination process.

Now the water that comes out of the – the permeate water is, is fairly devoid of any dissolved solids. And it's sort of – if we have to minerals back into it. We're adding calcium and magnesium, and also chlorine for disinfection, back into the water because all of that have been stripped out of the water in the RO process. And the primary purpose of that is to provide some balance and buffer capacity to the water, and add calcium, magnesium minerals for taste. If you drank the water out of this without adding the post treatment, it would be like drinking distilled water. It's got very little flavor, and also potentially . . . (inaudible) . . . But once you've – once you've done the post treatment, you've rebalanced the water, got the taste, and has little

impact to any . . . (inaudible) . . .

Some questions regarding operation and maintenance to the plant. We have – IDE, we own and operate the largest sea water desalination plant in the world. The capacity is up to 165 million gallons per day. And part of our efforts initially will be operating the plant, and transitioning that over to Pulama Lanai's staff to operate the plant within time. As part of that we're preparing an operational and maintenance manual that will describe all of the process involved – all, in detail, I've provided her a brief overview. All the process equipment will be included. All the manufacturer data so can – testing – that went into verify. All the products that go into the desalination plant has met their specifications and standards. It will also have – contain all the operating set points that will be confirmed during the pilot testing that will go on in the next month or two here. Document all of that. How the plant should be operated. We'll include all of the original manu – original equipment manufacturer's information,maintenance procedures, preventative maintenance, and then monitoring parameters.

Mr. Ornellas: Okay, any questions anybody? Go ahead Butch.

Mr. Gima: At the Lanai Water Advisory Committee meeting John Stubbart talked about the different levels of product water. You mentioned just one and then the brine. Is that still the intention what John said or is it going to be what you just said?

Mr. Cramer: There actually be two different types of water. There will be – the feed water comes into the plant, and coming out we have the product water and we have the brine. In addition part of that product water will be reblended with sea water to raise the salinity for golf course irrigation, not for the potable water, only for the golf course irrigation and other landscape irrigation. Some of the plants, particularly the turf grass with the – especially the golf course – doesn't function well. . . (inaudible) . . . The grass grows much effective at higher salinity. So, for that reason there are two different types of product water that will come out of the plant. One is primarily drinking water, the other for irrigation.

Mr. Gima: And do the . . . (inaudible). . . product water can be used for the pump hydro, the ag, as far as human consumption?

Mr. Cramer: Yes.

Mr. Gima: You're not going to make any changes . . . (inaudible) . . .

Ms. Kaye: Sally Kaye. I'm sorry. I want to visualize what you're saying. You're going to have x-amount of gallons of product water, a portion of that will stay as drinking potable, you'll rechlorinate and whatever. And then how much – just because you said blend, I didn't understand – blend with what?

Mr. Cramer: Right. So just speaking hypothetically – we take 100 gallons of saline ground water from the well that Tom is going to put in. About 45% of that 100 gallons – say 45 gallons – will become product water, right, that will go on to the potable water distribution system. The

balance, 55 gallons, is brine that will be processed and put to the – put into the disposal well which goes back into the ground and ultimately makes it way back out into the sea. The reblending is only for the irrigation water especially with the golf course. And that is taking essentially a portion of the brine that's produce and blending it in with the product water so that we can raise the salinity so that we have water that is suitable for high, high salt tolerant grass on the golf course.

Ms. Kaye: So is that 100 – that 100 gallons you're talking about isn't just going be potable. You're going to take a portion of that and put in salinity and make it for ag – for irrigation? Tom is saying yes.

Ms. Sodaro: Kaiulani Sodaro. Yeah, so just using Sam's example – 45 gallons of water is what we get. So that 45 gallons of product, or permeate water, would go three ways. So the golf grass requires a certain salinity level. That's what Sam was talking about, the re-blend back in. And so –

Ms. Kaye: . . . (Inaudible) . . .

Ms. Sodaro: Yeah – that's a portion of 45 gallons . . . (inaudible) . . . If we added chlorine to it that would enter the potable distribution system and then the balance of the gallons of water, that would go up to ag. And, and that would be like the pump hydro. The only difference between the ag water and then, of course, what would then being potable, is the addition of chlorination in our process. That's not a universal statement . . . (inaudible) . . .

Ms. Kaye: Thank you.

Mr. Ornellas: Any other questions? Go ahead Mr. Gima.

Mr. Gima: Butch Gima. I, I thought it was just going to be LNG for fuel for firm power . . . (inaudible) . . ., but it looks like you've got diesel over there. Can you talk about that?

Ms. Sodaro: Sure. So, we're preparing for emergency generation, back up generation, and so that comes not only in equipment back up, but also fuel supply back up. And so while all of you know we are looking into introducing LNG to the island, obviously there's a history of diesel already being serviced. One of the generators that we're looking at to help us get the reliability and redundancy from a power generation and reliance on a water production sample, is having a generator that can then run on diesel. And let's say there's an interruption in the LNG supply. So, it's really a way for us protect on the reliability of the water service, and then a redundancy on power generation.

Because of the fire code requirements and some other building code requirements, you can't have a co-mingling and storing of those fuels. These are – they look really large. They're primarily driven by required setbacks for safety reasons. We are working with Hawaii gas. In addition to the onsite monitoring of obviously fuel storage facilities which we'll have here. They will also be remotely monitored by Hawaii Gas too. So, there's a couple layers also is what I'm

trying to share about the monitoring site. So that's why you see some portion. You know this was symbolic of the sizing that it – these tanks are going to be that big, per se. So that's why you see some diesel.

Mr. Gima: . . . (Inaudible) . . . next to the bottom two million gallons – two million gallon production water tanks, x of them is for future tanks? Future capacity tanks?

Ms. Sodaro: Yes. Yes. Okay, I guess the Chair went on the –

> *(The Lanai Planning Commission recessed at approximately 3:15 p.m., and reconvened at 3:25 p.m., at the proposed disposal well 1 site. Portions of this section were deemed inaudible due to the background noise.)*

Mr. Nance: We're standing right here on the road between the DW1 well site there, and the DW2 well site there. The concentrate from the RO plant will come down that will go into a storage tank and then be disposed of in one of the other of these wells . There is below here the 1.8 million gallon basin that has been constructed so in case there is a well issue with disposal we can by-pass the well for a period time, put it in that large thing until we fix whatever is the issue.

The drilling here, this well has been drilled. They drilled this in actually three steps. We start with a small, what we call a . . . (inaudible) . . . hole. It's 14-inches in diameter. It is been drilled down to 870 feet. That's a total of 400 feet below sea level. The ground level of the well is about 470. The second step is to take that 14-inch hole and ream it out to 17 ½. When we do that, then we do a series of tests in that open hole using this . . . (inaudible) . . . spacing to isolate various zones to see what we've got. We've been through that steps with this DW1 well. The third step after we get that stuff out of the ground again is to open the 17 ½ out to 27 inch and install this 20-inch casing, solid casing, and perforated casing, put it in the ground, cement it in place and do the final testing which will be pumping it out to develop it and then disposing back in to it. The disposal test can't happen until we get those wells completed because the disposal is going to be done by pumping from one to the other, reverse the process, pump back to that one. So this DW2 well they're still working on that initial pilot. I think the ground elevation there is about 485. They're almost to sea level now and they will take that one also down to 400 feet below sea level, go through the same steps as we're a little ahead here on the DW1 well. That's what's happening here.

Mr. Ornellas: Any questions? Go ahead.

Mr. Brad Bunn: Brad Bunn. What – do you have full circulation where you're drilling these wells? Do you have full circulation . . . (inaudible) . . .

Mr. Nance: Generally yes.

Mr. Bunn: . . . (Inaudible) . . .

Mr. Nance: . . . (Inaudible) . . . air flow mixture, with a little bit of water added,. But it's a big issue. When you're drilling 800 feet down you're creating a whole bunch of cutting. And if you can't get them out of the hole, you'll bury yourself in the hole. So what he's saying is basically are we capable of circulating around the hole. Sometimes you can circulate all the way up, and out, and that's what's happening there. Sometimes you go through very permeable formation and the cutting will come up and disappear on you. But you've got to get them out of where you're drilling or you'll bury your drill tool and then you've got a fishing job where you're going to start over.

Mr. Bunn: . . . (Inaudible) . . . use a hammer type operation?

Mr. Nance: It's not hammer. It's professional.

Mr. Bunn: . . .(Inaudible) . . .

Mr. Nance: . . . (Inaudible) . . . so we've got a 14-inch pilot and then a hole opener above that.

Mr. Ornellas: Any other questions? Anybody else?

Mr. Chun: Arlan with Pulama Lanai. This is – as far as all this whole process that you saw today, this is all under the regulatory of Department of Health. They're looking at the well's pilot operation, the technology for the desal RO system, operations, maintenance, emergency measures – everything's is under – it's being regulated by the Department of Health so it's a state, a state oversight.

Mr. Ornellas: Anything else members?

Ms. Sodaro: We also wanted to have Steve come back up and give – see if there's any questions now that we're on the other side of what he explained on the monitoring.

Mr. Ornellas: I thought this was it.

Ms. Sodaro: . . .(Inaudible) . . . So we're just checking in. This is our last stop.

Mr. Dollar: Steve Dollar. Let me just add – I kind of gave you the overview of the monitoring is but I look at this monitoring as an insurance policy. We're not expecting based on the geology and the physics of the disposal of the hyper saline brine that's going down below sea level to not do anything but to stay at that depth. In fact, to dive deeper into the rocks before it defuses. So by sampling at the shoreline it doesn't mean we're expecting to see it there. It's the opposite. So this is just an insurance policy to make sure all the other assumptions and the physics and the processes are not – of . . .(inaudible) . . . are not something funny is going on. So all this monitoring that goes on . . . (inaudible) . . . is basically just to check. It's to double to make sure everything is okay.

Mr. Oshiro: Quick question. Bradford Oshiro. The culture site, are they protected? I mean, just

in case there's a spill or something, they won't affect the site?

Mr. Maly: Tom, do you want to – the question was about the site. Just where they are in relationship of where we are.

Mr. Tom Dye: They're on the other side as you're going down. I'm sorry, my name is Tom Dye, I'm the archaeologist working with Pulama Lanai. The site . . . (inaudible) . . . on the other side of these . . . (inaudible) . . . that you see here, as the ground slopes down towards the gulch.

Mr. Oshiro: No, no. That wasn't my question. My question was if we had problems with those wells over here, the spill will not affect the sites, the cultural sites, right?

Mr. Maly: That's correct. It's really down sloped to a reservoir, potential reservoir.

Mr. Nance: It's not potential. It's a . . . (inaudible) . . .

Mr. Maly: It will be holding place if it's needed, yeah.

Mr. Nance: Right. So there's a way to by-pass the wells if they're not functioning. They go into that large basin which you can't quite see up here.

Ms. Sodaro: So when we jump back in and we drive down, we're going to exit through the resort. If you look to your right, you'll be able to see what the perimeter fencing looks like that we put around all of the archaeological sites. . . (inaudible) . . . 20 foot setback looks like. You can't see the two that are off the ridge line because they're off the ridge line. But we can see one of them on our way down.

Mr. Gima: Butch Gima. Can somebody talk about the alternative uses of the brine? At the Lanai Water Advisory Committee meeting, John Stubbart has talked about Pulama's plans, potential plans to use the brine for other things rather than just injecting it back into, into the ground.

Mr. Chun: Arlan with Pulama Lanai. That's something that we haven't identified yet, Butch. You know, people talk about brine. . . (inaudible) . . . Some of the brine is going to get re-directed to the golf course. That's something that we still are – still researching. But we don't have a product at this point.

C. NEXT REGULAR MEETING DATE: MAY 21, 2014, 5:30 pm, Lanai Senior Center

D. ADJOURNMENT

Mr. Ornellas: Anything else anybody. This meeting is now recessed until 5:30, the Lanai Senior Center. See you all there.

There being no further discussion brought forward to the Commission, the site inspection was recessed at approximately 3:30 p.m., and the regular scheduled meeting to reconvene at 5:30 p.m. at the Lanai Senior Center.

Respectively submitted by,

LEILANI A. RAMORAN-QUEMADO
Secretary to Boards and Commissions II

RECORD OF ATTENDANCE

PRESENT:
Joelle Aoki
Shelly Barfield
Stuart Marlowe
John Ornellas, Chair
Bradford Oshiro

EXCUSED:
Kelli Gima
Stacie Koanui Nefalar, Vice-Chair
Beverly Zigmond

OTHERS:
Clayton Yoshida, Planning Program Administrator, Current Planning
Ben Sticka, Staff Planner
Richelle Thomson, Deputy Corporation Counsel