CITY OF West Linn

Memorandum

Date: May 2, 2012

To: File No. CUP-12-02/DR-12-04 (Lake Oswego Water Treatment Plant expansion)

From: Zach Pelz, Associate Planner

Subject: Supplemental testimony for May 2, 2012, Planning Commission public hearing

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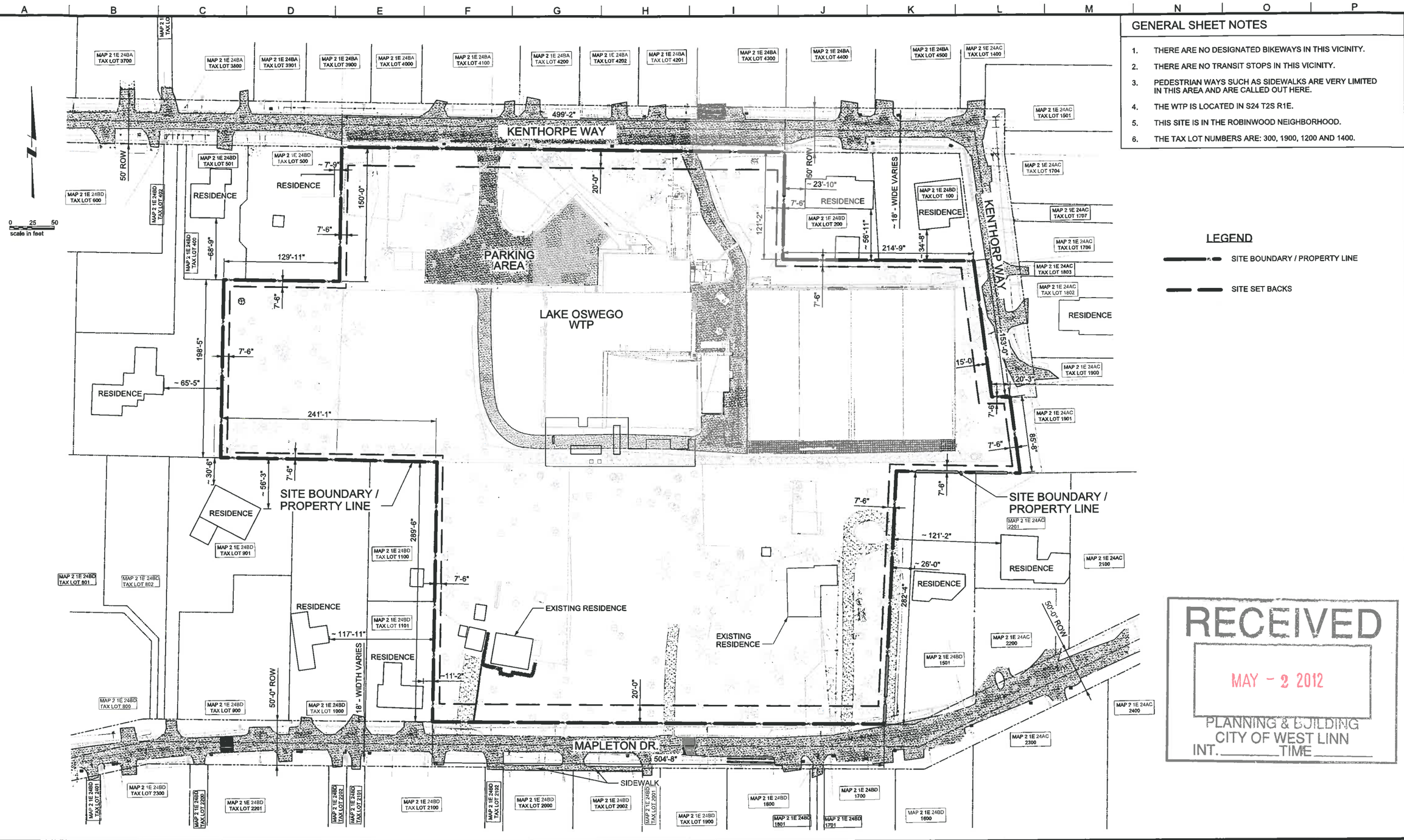
This memo supplements the public record for project file CUP-12-02/DR-12-04 with written testimony from the applicant received on May 2, 2012.

GENERAL SHEET NOTES

1. THERE ARE NO DESIGNATED BIKEWAYS IN THIS VICINITY.
2. THERE ARE NO TRANSIT STOPS IN THIS VICINITY.
3. PEDESTRIAN WAYS SUCH AS SIDEWALKS ARE VERY LIMITED IN THIS AREA AND ARE CALLED OUT HERE.
4. THE WTP IS LOCATED IN S24 T2S R1E.
5. THIS SITE IS IN THE ROBINWOOD NEIGHBORHOOD.
6. THE TAX LOT NUMBERS ARE: 300, 1900, 1200 AND 1400.



LEGEND

- SITE BOUNDARY / PROPERTY LINE
- SITE SET BACKS

MWH
806 SW BROADWAY, SUITE 200
PORTLAND, OREGON 97205

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED: ####
DRAWN: ####
CHECKED: ####
CHECKED: ####
APPROVED: ####

REVISIONS (ADDRESS)???				
REV.	DESCRIPTION	BY		APP.

OWNER:
CITY OF LAKE OSWEGO
380 A AVENUE
LAKE OSWEGO, OR 97034
PHONE: 503-635-0270

Lake Oswego · Tigard Water Partnership
sharing water · connecting communities

LAKE OSWEGO AND TIGARD WATER TREATMENT PLANT

DESIGN REVIEW & CONDITIONAL USE

SITE ANALYSIS
VICINITY MAP

FILENAME
PROJECT NUMBER
SCALE 1" = 50'
DRAWING/FIGURE NUMBER 1.1
OF

PC Meeting 5/2/2012
2

PLOT DATE: September 10, 2008 - 1:55PM USER: slhurst
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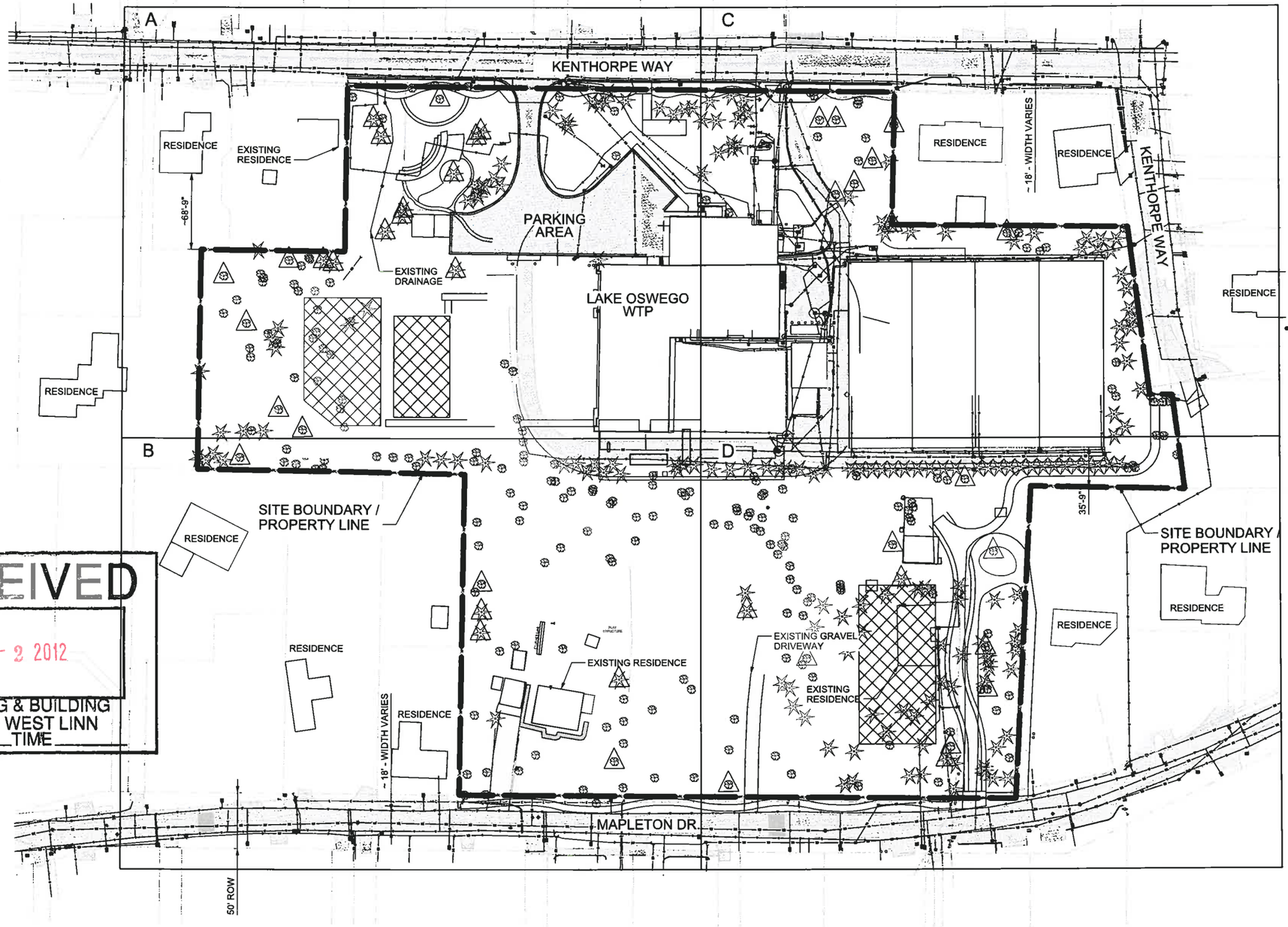

GENERAL SHEET NOTES

1. SITE BOUNDARY IS WITHIN THE ROBINWOOD NEIGHBORHOOD ASSOCIATION.
2. GROSS SITE AREA IS 9.24 ACRES.
3. THE ENTIRE SITE SLOPE IS LESS THAN 15% GRADE.
4. THE EXISTING SITE CONTAINS NO POTENTIAL NATURAL HAZARDS.
5. THE EXISTING SITE CONTAINS NO RESOURCE AREAS.
6. THE EXISTING SITE CONTAINS NO SIGNIFICANT FEATURES.
7. THE EXISTING SITE CONTAINS NO STREAMS OR STREAM CORRIDORS.
8. THERE ARE NO HERITAGE TREES ON SITE.
9. THERE ARE NO GOAL 5 RESOURCES ON THIS SITE.
10. THERE ARE NO TYPE II LANDS ON THE EXISTING SITE.
11. HARDSCAPE HATCHES NOT SHOWN FOR CLARITY, SEE FIGURES 2.1 - 2.4.
12. TREE SIZES AND NUMBER ARE NOT SHOWN ON OVERVIEW FOR CLARITY - SEE FIGURES 2.5 - 2.12 FOR INFORMATION ON EXISTING TREES AND TREES TO BE REMOVED.
13. DRIPLINE PLUS 10-FT TOTAL AREA = 72,700 SQ-FT AND IS 18% OF ALL NON-TYPE I AND TYPE II LANDS.
14. EXISTING STRUCTURE AND PARKING DIMENSIONS ARE SHOWN ON 2.1 - 2.4.
15. LOCATIONS OF EXISTING STRUCTURES OFF-SITE ARE APPROXIMATE.
16. ALL TREES SHOWN ARE 6-INCH OR GREATER AT 5-FT DBH.

LEGEND

- SITE BOUNDARY / PROPERTY LINE
- C — KEY PLAN BOUNDARY
- 142 — CONTOUR LINE
- 2'-6" — DIMENSION LINE
- EXISTING PAVEMENT
- EXISTING GRAVEL
- EXISTING NATURAL PERVIOUS GROUND
- EXISTING CONSTRUCTED PERVIOUS SURFACE
- E — UNDERGROUND ELECTRICAL
- G — GAS
- OH — OVERHEAD POWER
- SD — STORM WATER UTILITY
- SS — SANITARY SEWER
- T — UNDERGROUND COMMUNICATION
- W — UNDERGROUND WATER UTILITY
- MISCELLANEOUS BORING
- FLOW ARROW
- DECIDUOUS TREE
- CONIFEROUS TREE
- TREE OF SIGNIFICANCE
- UNREGULATED TREE REMOVAL
- REGULATED TREE REMOVAL
- TREES TO BE SAVED

PC Meeting 5/2/2012
3

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LAKE OSWEGO AND TIGARD WATER TREATMENT PLANT
DESIGN REVIEW AND CONDITIONAL USE
SITE ANALYSIS - EXISTING SITE OVERVIEW

FILENAME
PROJECT NUMBER
SCALE 1" = 50'
DRAWING/FIGURE NUMBER 2.0
OF

PLOT DATE: September 10, 2008 - 1:55PM USER: dbrhat
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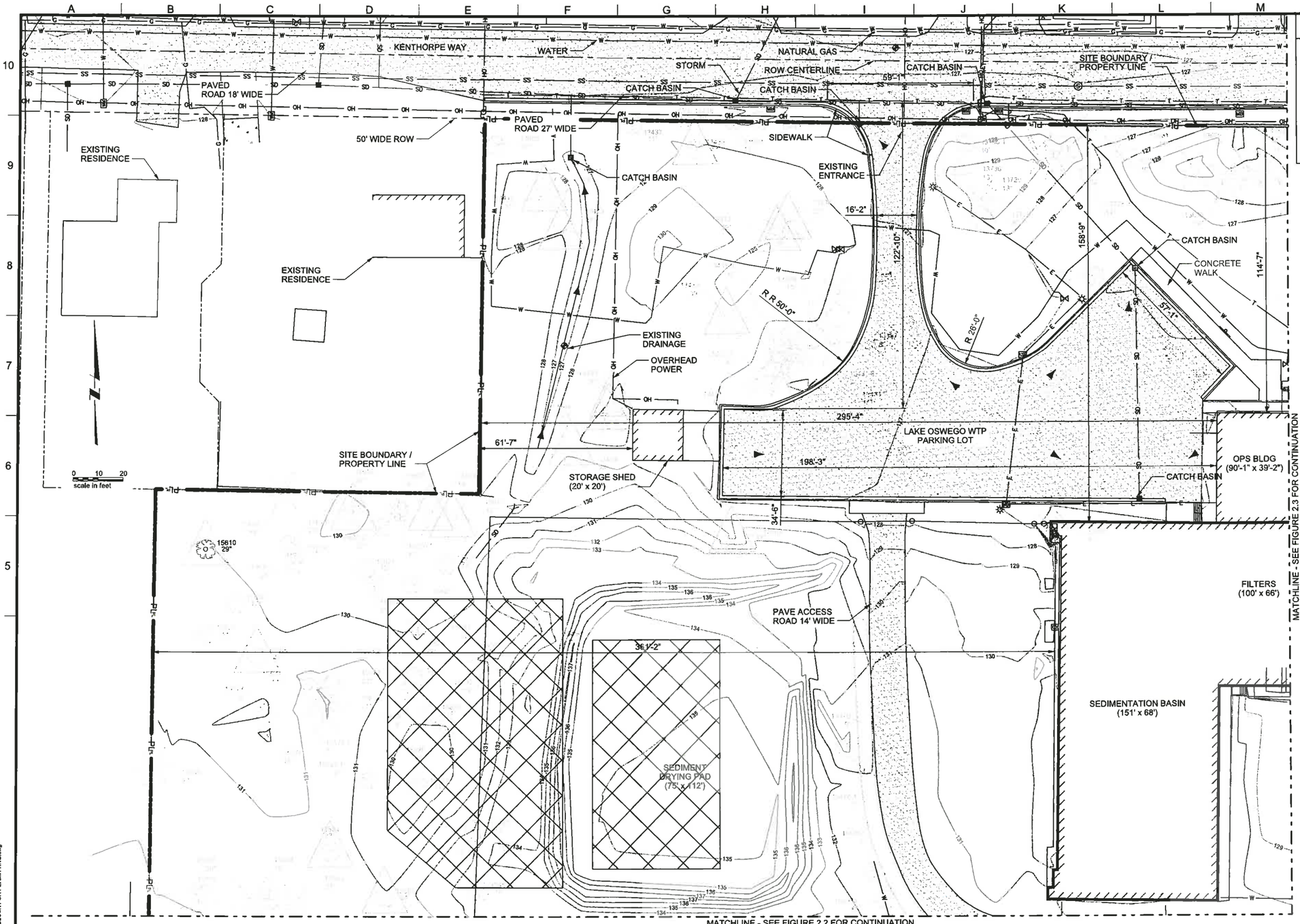
GENERAL SHEET NOTES

1. SEE FIGURE 2.0 FOR LEGEND.



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LAKE OSWEGO AND TIGARD WATER TREATMENT PLANT
DESIGN REVIEW AND CONDITIONAL USE
SITE ANALYSIS - EXISTING SITE
AREA A

FILENAME	
PROJECT NUMBER	
SCALE	1" = 20'
DRAWING/FIGURE NUMBER	2.1
#### OF	

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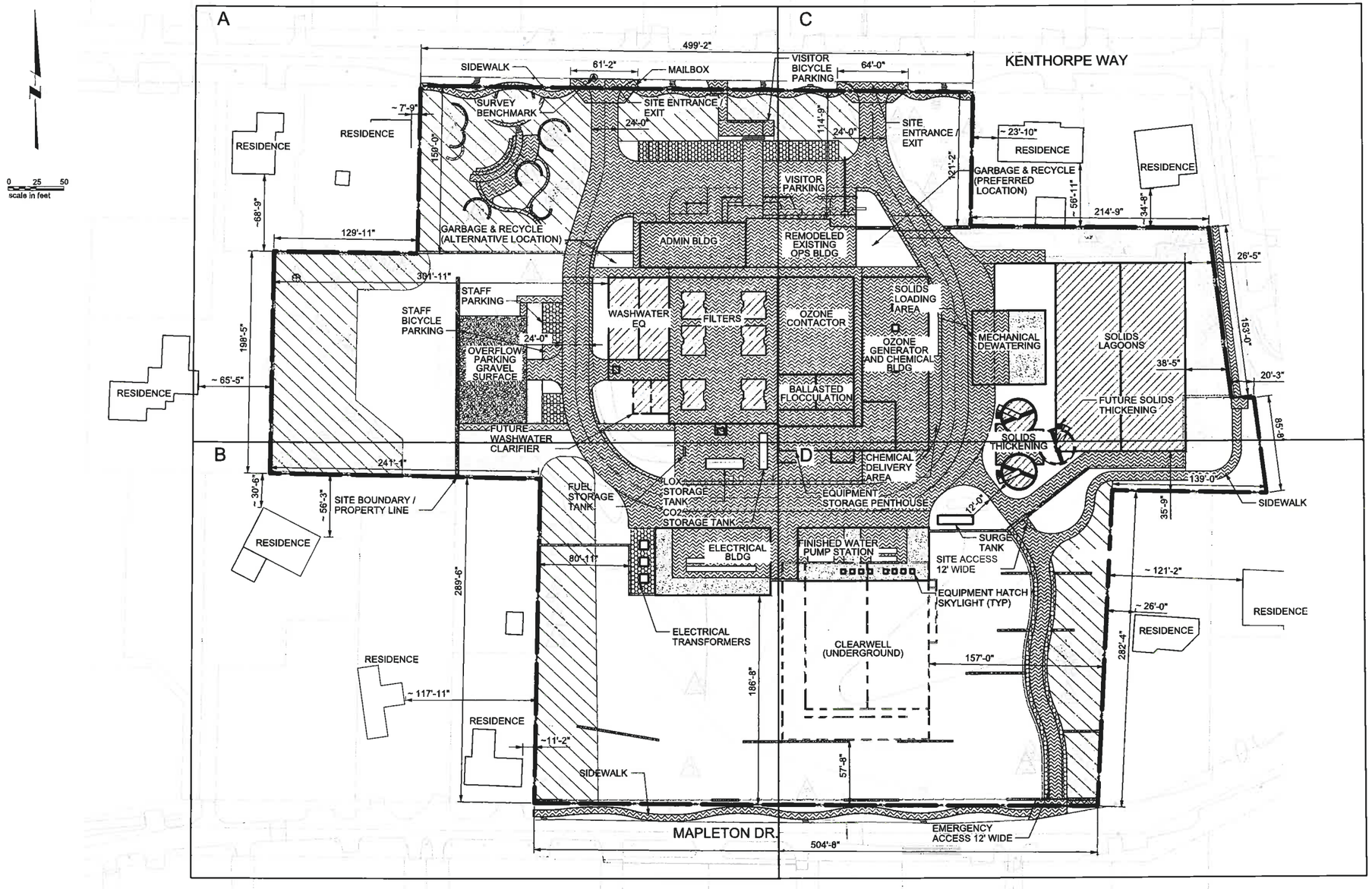

GENERAL SHEET NOTES

1. UTILITIES NOT SHOWN FOR CLARITY. SEE FIGURES 5.0 - 5.6
2. SEE FIGURES 11.0 - 12.6 FOR PLANTING PLANS - NOT SHOWN FOR CLARITY
3. SEE FIGURE 7.0 FOR PEDESTRIAN AND AUTOMOBILE CIRCULATION PLAN, PARKING AND DIMENSIONS.
4. THERE ARE NO TYPE II LANDS ON THIS SITE.
5. FOR TREES TO BE REMOVED, SEE FIGURES 2.9 - 2.12.
6. GROSS SITE AREA IS 9.24 ACRES.
7. FOR FENCE TYPE AND DETAIL - SEE FIGURES 11.0-12.6.
8. GARBAGE AND RECYCLE TO BE SCREENED BY SECURITY FENCE. ACCESS BY COLLECTOR VIA SEPERATE GATE
9. TREE PROTECTION AREA SHOWN EQUALS 18.7% OF THE TOTAL SITE AREA
10. THE FAR = 0.155
11. THE PROPOSED LOT COVERAGE = 85,610

LEGEND

- SITE BOUNDARY / PROPERTY LINE
- C — KEY PLAN BOUNDARY
- CONSTRUCTED PERVIOUS SURFACE
- CONSTRUCTED GRAVEL SURFACE
- IMPERVIOUS SURFACE
- GREEN ROOF
- OPEN PROCESS TANKS
- OPEN SPACE / LANDSCAPE AREA
- TREE PROTECTION AREA
- CONIFEROUS TREE TO REMAIN
- DECIDUOUS TREE TO REMAIN
- TREE OF SIGNIFICANCE
- 142 — CONTOUR LINE
- SITE SET-BACKS
- SURVEY BENCHMARK

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LAKE OSWEGO AND TIGARD WATER TREATMENT PLANT
DESIGN REVIEW AND CONDITIONAL USE
PROPOSED SITE PLAN OVERVIEW

FILENAME
PROJECT NUMBER
SCALE 1" = 50'
DRAWING/FIGURE NUMBER 3.0
OF

PC Meeting 5/2/2012
5

PLOT DATE: September 10, 2008 - 1:56PM USER: Jbrust
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PC Meeting 5/2/2012
6

KENTHORPE WAY

SEE FIGURE 3.1A FOR SITE SECTION / RENDERING

STEPPING STONE SWALE CROSSING 4/14.1

LOW SITE WALL 5/14.0

GOOD NEIGHBOR FENCE 2/14.0

ARCHITECTURAL SECURITY GATE 1/14.1

ARCHITECTURAL SECURITY WALL 1/14.0

GOOD NEIGHBOR FENCE WITH INTEGRATED SECURITY CHAINLINK 2/14.0

VISUAL SCREEN FENCE 4/14.0

0 10 20 scale in feet

RESIDENCE (54' x 45')

RESIDENCE (37'-2" x 25'-0")

68'-9"

7'-9"

46'-2"

R = 13'

R = 8'

CONCRETE

CRUSHED ROCK

CONCRETE

CONCRETE

R = 10'-6"

95'-3"

R = 10'-5"

18'-1"

15'-7"

R = 8'

20'-9"

R = 13'

CRUSHED ROCK

ROLLING COLLECTION ACCESS GATE

GARBAGE & RECYCLING (ALTERNATE LOCATION)

SITE BOUNDARY / PROPERTY LINE

132'-6"

301' - 11"

CONCRETE SIDEWALK

41'-0"

54'-0"

STAFF BICYCLE PARKING

OVERFLOW PARKING GRAVEL SURFACE

STAFF PARKING

96'-0"

97'-2"

28'-8"

8'-10"

SIDEWALK

SITE ENTRANCE

59'-1"

N 634247.76

E 7654194.99

CLEAR VISION AREA

SITE BOUNDARY / PROPERTY LINE

24'-0"

73'-0"

46'-2"

11'-9"

VISITOR BICYCLE PARKING

TRASH RECEPTACLE

VISITOR PARKING

ENTRANCE / WATER FEATURE

ADMIN BUILDING (90'-1" x 39'-2")

OPS BLDG (43'-11" x 96'-10")

MATCHLINE - SEE FIGURE 3.3 FOR CONTINUATION

BREEZEWAY

8'-10"

WASHWATER EQUALIZATION (56'-0" x 89'-0")

FILTERS (103'-0" x 120'-0")

3'-0"

SIDEWALK

EQUIPMENT ACCESS HATCH

FUTURE WASHWATER CLARIFIER (36'-0" x 39'-0")

EQUIPMENT ACCESS HATCH

CO2 STORAGE (17'-2" x 42'-2")

DIESEL STORAGE (17'-2" x 42'-2")

MATCHLINE - SEE FIGURE 3.2 FOR CONTINUATION

GENERAL SHEET NOTES

1. SEE FIGURE 3.0 FOR LEGEND.

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LAKE OSWEGO AND TIGARD WATER TREATMENT PLANT

DESIGN REVIEW AND CONDITIONAL USE

PROPOSED SITE PLAN
AREA A

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PLOT DATE: September 10, 2008 - 1:55PM USER: jdrael
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Lake Oswego · Tigard Water Partnership
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LAKE OSWEGO-TIGARD WATER PARTNERSHIP

Fact Sheet for CU-12-02/DR-12-04

1. ***Why can't the plant be located in Lake Oswego?***

Lake Oswego determined fairly early on that expansion of the existing plant site would be the most responsible and efficient alternative for both Tigard and itself. The current proposal reprises a plant modernization and expansion concept that was developed in 1996 that responds to a condition of approval for CU-88-02/DR-88-14 (see 1996 staff report, pp. 2 and 4). The West Linn Water Master Plan (WLWMP) considered the likelihood of an expansion of the current facility along with the existing intertie agreement and Comprehensive Plan in the analysis of and recommendation for a preferred approach to address West Linn's need to develop a reliable emergency water supply capacity, (see 2012 staff report, pp. 28-29.) In planning for essential services such as water supply, municipalities have a responsibility to make the most efficient and effective use of taxpayer and ratepayer dollars. Lake Oswego also has a responsibility to the environment, to make sure we act sustainably and to meet our agreement with West Linn to provide emergency water. Expanding the plant at its current location is the most efficient and effective way of fulfilling all of these responsibilities.

2. ***Why is the plant being designed to supply an additional 6 mgd of water now when its own water demand forecasts indicate this water won't be needed by the Partnership for at least the next decade?***

Because it can take decades to plan and build new or expanded facilities, it is prudent for communities to plan for the next 50 or more years. Economies of scale and the modular nature of WTP plant process equipment and structures create an opportunity to add the additional 6 mgd capacity at very little extra expense. Adding the 6 mgd as part of a future construction project would be significantly more expensive.

Providing for the additional capacity now also avoids the need for a future major construction project in the neighborhood. Having this additional supply now also makes a larger supply of emergency water to West Linn until the Partnership's water demands require increments of the 6 mgd. During certain times of the year, up to 6 mgd could be available for at least the next 25 years, giving the City of West Linn additional time to explore other alternatives to address the supply reliability concerns raised in their adopted Water Master Plan, (see 2012 staff report, page 29.)

3. ***What safeguards are being designed into the plant to eliminate/minimize the release of large volumes of water from the underground reservoir or on-site pipelines?***

The Partnership will design the facility to a seismic performance standard that ensures the WTP will remain occupiable and operational even after the design basis earthquakes, (see WTP application, Section 17, Geotechnical Report and Site Specific Seismic Analysis.)

These design events consider a Cascadia Subduction Zone "Megathrust" magnitude 9.0 earthquake, and local crustal earthquakes such as a Portland Hills Fault earthquake to magnitude 7.0. To achieve this goal, the plant will be constructed using seismic loading parameters and response spectra from a site specific seismic hazards evaluation, not generalized, code-based seismic parameter values.

Geotechnical explorations disclosed loose sandy soil beneath the groundwater table at the site that is considered liquefiable under the design earthquake. Our analysis and modeling concluded that liquefaction-induced settlement of several inches is the predominant site hazard to structures. The design team has chosen to respond to this potential hazard by using pile foundations for structures.

Foundation design for the plant incorporates the most current thinking and information available relating to the design of essential public facilities for seismic resiliency. The selected auger-cast pile foundation system incorporates drilled and grouted piles that can be constructed with minimal site vibration, noise, and risk to ongoing operations.

The new pile supported structures and seismically retrofitted existing structures are designed to survive the design earthquake ground motions and liquefaction while remaining operational and occupiable. Other structures in the neighborhood may expect heavy damage from such an event. An operational clean water facility would be a valuable asset to the community and the region following a significant earthquake.

Water holding structures, including the underground clearwell, will be constructed of reinforced concrete supported on auger-cast piles. The design of the foundation systems will restrict movement and settlement of the structure to within very small tolerances. Limiting settlement assures no catastrophic failure of the tank. However, if a tank wall or floor cracked limited leakage could result. In such an unlikely event, water could be pumped from the reservoir to minimize the volume lost to the surrounding soils. Any leakage of tank contents would occur slowly into surrounding soils. No catastrophic, uncontrolled release of water below grade, or to the ground surface would result that might impact adjoining properties.

On-site piping will be designed to 'flex' and move relative to connections to underground structures. Pipe design will incorporate modern, high strength materials, and piping will be subjected to rigorous quality control inspections and testing during manufacture and installation. Design will also incorporate the latest in engineering knowledge for seismic resiliency of lifelines.

4. ***Lake Oswego and Tigard are introducing an increased risk into the neighborhood. Can it insure private property owners for this increased risk?***

The Cities of Lake Oswego and Tigard are well-insured for those events for which they are legally responsible under the Oregon Constitution and laws. The Cities liability policies will cover damages to third parties when the cities are at fault. Individual property owners may, of course, obtain insurance to cover property damage from perils that do not result from the fault of another. However, Oregon law does not provide for no-fault liability for maintenance and operation of public facilities.

It is the function of land use approvals, building codes and other safety codes to insure that sufficient safeguards are imposed to assure public safety. Those safeguards are found in the standards used for construction and operation of public facilities, which are met in this case. Cities like West Linn, Lake Oswego and Tigard maintain not only water systems, but also roads, bridges, sidewalks, sanitary sewer systems, storm water systems, public buildings, parks and open spaces, etc., and must meet those construction and operational standards. It is not appropriate to revisit the Oregon constitutional and statutory scheme on liability in a land use matter where the applicable construction codes and operational standards are met. We note that West Linn wisely does not require such a result for its own public works beyond those constitutional and statutory limits, presumably for these same reasons.

5. ***Why is there no backup power generation planned for the new plant? What if both electrical feeds are not operating?***

The Partnership made a decision *not* to provide emergency power supply to the WTP by installing a large, on-site, diesel powered emergency generator in response to neighbor concerns for noise, fuel storage, truck trips, and air quality reasons. Instead, the upgraded WTP will have a redundant electrical supply from the local utility (PGE), (see WTP application, Section 4, page 79.) Two completely separate substations will serve the plant. According to Milo Starr, PGE Design and Service Group, in the event of an outage at one or both of these substations or damage to electrical feeder lines from these substations, PGE's response protocol is to:

1. Repair electrical transmission lines or substations as a first priority. PGE maintains an inventory of spare transformers that can be delivered to a substation within a matter of hours.
2. Repair electrical feeder lines to critical facilities next. The water treatment plant is considered by PGE to be a critical facility just like hospitals and wastewater treatment plants.
3. Repair neighborhood electrical systems.

In addition, a small generator will be located at the plant to power lighting and critical plant control systems, (see WTP application, Section 4, page 16.) Further electrical redundancy for critical instrumentation, monitors, valves, and alarms will be provided by an Uninterruptable Power Supply (UPS) system. The redundant utility power supply will be sized to allow treatment and pumping to continue albeit at a reduced capacity. In the event of loss of *both* electrical supplies, the emergency generator and UPS systems would maintain power for lighting, alarms, monitors, valves, and security systems.

Depending on when the outage occurs, Lake Oswego and Tigard can rely on over 50 million gallons of water stored in reservoirs. This storage volume could supply the two cities' water needs for more than a week, if the outage occurred during a typical winter and for several days if the outage occurred during a peak demand period. *This stored water could also be used to supply West Linn's emergency intertie pump station even if the WTP is without power.* As West Linn's water supply system has less than *one day* of water storage, Lake Oswego and Tigard's storage could fill a critical emergency gap for West Linn.

6. What chemicals will be stored on site and how will associated risks be managed?

Chemicals stored on the site are as follows: (see WTP application, Section 18, Hazardous Materials Inventory Statement.)

i. Sodium Hypochlorite (existing) – Disinfectant; non-combustible, non- flammable.

ii. Sodium Hydroxide (new) – Corrosion Control; non-combustible, non-flammable. Replaces existing lime storage and feed systems.

iii. Aluminum Sulfate (existing) – Coagulant; liquid Alum is not a hazardous material.

iv. Liquid and dry polymers (existing) – Coagulant and filter aid; Polymers are relatively inert and not considered a hazardous material.

v. Calcium Thiosulfate (new) – Quenching agent for ozone; contains no hazardous ingredients and is rated zero for health, fire, reactivity, and persistence.

vi. Ozone (new) – Disinfectant; oxidant for taste and odor control; toxic at low concentrations; fire hazard.

vii. Carbon Dioxide (existing) – Corrosion control; liquefied under pressure; colorless, odorless.

As shown above, most of the chemicals used in the treatment of water are not flammable, explosive, or combustible.

Chemical storage tanks except liquid oxygen and carbon dioxide will be located inside buildings and within reinforced concrete containment 'tubs'. Chemical storage tanks will be anchored to the floor to resist seismic uplift and spillage of contents. Chemical containment will be sized in compliance with fire code (i.e., largest tank volume plus 20 minutes of fire sprinkler flow). Tank volume will be monitored continuously with level instruments. If a leak occurs, instruments will detect it and send an alarm to plant operators.

Ozone: If a problem occurs with the ozone disinfection equipment, it will shut down automatically. Plant operators closely monitor the water treatment process, which will use sophisticated technology and multiple back-up systems. The ozone system will have many sensors and alarms to notify plant operators of problems or potential problems.

In the very unlikely event that a release of ozone into the atmosphere occurred, the system would automatically shut down. The ozone would revert back to oxygen molecules, which are normally present in the breathable atmosphere.

Liquid Oxygen Storage (LOX): The LOX storage tank is double-walled and insulated and will be located atop a non-flammable concrete containment area. The tank will be fit with an automatic isolation valve that will close in the event of a leak in downstream piping. The tank will be located in the center of the plant maximizing setbacks from neighboring properties. Tanks are manufactured to strict pressure vessel codes and standards. The Partnership will lease the tank and related equipment from reputable suppliers. Tanks and equipment will be inspected and tested in accordance with accepted industry standards and practices.

As a condition of approval for the new upgraded plant, an update to a prior 1996 Hazardous Materials Management Plan will be developed for review and approval by Tualatin Valley Fire and Rescue and will be provided to the City of West Linn. It will also be available for review at the WTP upon request of interested citizens.

The WTP has been and will continue to be operated in accordance with best management practices in the municipal drinking water industry by a team of water treatment professionals. Our staff receives regular training and professional development as required by EPA, Oregon-OSHA, and the Oregon Health Authority.

In the unlikely event of a release or spill that could potentially endanger the neighborhood, the City of Lake Oswego, as the provider of emergency dispatch services for West Linn, would launch reverse 911 messages on behalf of the West Linn Police Department. The operational aspects of chemical storage and use will meet all applicable safety standards.

7. Why isn't the upgraded plant using high efficiency lighting?

The upgraded plant will use high efficiency lighting and meets City of West Linn standards for lighting. The lighting will also be fully shielded to prevent offsite glare and light trespass. Depending upon operational and security needs in various plant locations, high pressure sodium, fluorescent, or metal halide and light-emitting diodes (LED) will be used, (see WTP application, Section 4, page 76; Section 13, Section 21, Figures 5.5-5.12.) These are considered appropriate for plant illumination needs. The proposed High pressure sodium and metal halide lamps are two of the most efficient, low energy, non-LED lamp types in use today.

8. Will the design of the new plant be compliant with applicable federal/state security rules?

Yes. While the Department of Homeland Security and Oregon Emergency Management do not regulate the design of water treatment facilities, it does provide guidance documents and assistance to owners of critical infrastructure with best management practices to protect such facilities against intentional malevolent acts. The Public Health Security and Bioterrorism Response Act of 2002 (the "Act"), requires each community water system to complete the following:

1. Conduct a Vulnerability Assessment ('VA');
2. Certify to USEPA that the VA was completed by the date specified in the law;
3. Submit a paper copy of the VA to USEPA;
4. Prepare or revise their emergency response plan based on the results of the VA; and
5. Certify to USEPA that the emergency response plan has been developed or revised by a date certain.

Lake Oswego completed a Vulnerability Assessment (VA) of its water supply system including the WTP, and has satisfied all requirements of the Act subsequent to the completion of the VA. The design of the upgraded plant will incorporate recommendations of the VA relating to administrative, physical and cyber security features.

9. What benefit will West Linn receive from the proposed upgrade of Lake Oswego's existing treatment plant that doesn't exist today with the current plant and the intertie agreement?

The benefits to the community of West Linn and the regional water supply system are numerous (see 2012 staff report, pages 28-30 and pages 41-43), and fall into several categories:

- Supply reliability
- Treatment reliability
- Operational reliability

A brief assessment of the current situation and the benefits resulting from the proposed upgrades are discussed below:

Supply Reliability:

The expanded plant will increase the reliable capacity of emergency water supply.

Current - The current intertie agreement indicates that Lake Oswego or West Linn provide each other with emergency water only if it is available. The existing WTP capacity of 16 mgd limits the ability of Lake Oswego to supply West Linn with emergency water during peak demand seasons extending from June through September. During these months, the water demands of Lake Oswego's citizens and wholesale customers consume most, if not all, of the plant's maximum treatment capacity. Lake Oswego has limited ability (<1mgd) to backfill water sent to West Linn from interties with other suppliers.

Proposed – The upgraded and expanded plant will be capable of treating up to 38 mgd of water. Due to successful and ongoing conservation programs and rate structures that discourage water waste, the cities of Lake Oswego and Tigard's current peak season/peak day demands range from 28 to 30 mgd. This suggests that surplus capacity available to West Linn could range from 10 to 6 mgd initially. Based on historic water demand information, the combined peak day demands of the Partnership are forecast to increase to 32 mgd by about 2026 and to approach 36 mgd by 2041 excluding Tigard's Aquifer Storage and Recovery (ASR). This suggests that 6 mgd of surplus capacity could be made available to West Linn during peak demand periods out to 2026, potentially diminishing to 2 mgd by 2041.

Treatment Reliability (and Storage):

The larger clearwell will improve water quality and increase the emergency supply of treated water.

Current – The 'direct filtration' process currently in use by the WTP is challenged to reliably produce high quality water during wet winter months when turbid water can upset treatment chemistry. Due to the small size of the existing clearwell (~400,000 gallons), under certain raw water quality conditions related to temperature and flow, the plant cannot produce water and at the connection point to the West Linn intertie that meets EPA disinfection requirements, ("CT", or Chlorine Contact Time). In order to meet CT standards before water reaches the first customer,

(Marylhurst University), Lake Oswego must use the volume of water contained within the pipeline between the WTP and Marylhurst.

Proposed – The upgraded WTP will replace the 'direct filtration' process with full 'conventional treatment' plus ozone to produce a superior quality of finished water to residents in Lake Oswego, Tigard, and during emergencies, West Linn. The larger clearwell will allow the new plant to meet CT within the clearwell and at the connection to West Linn's intertie pump station. The larger clearwell will provide additional benefit in the form of a larger volume of treated water stored on-site that can be used in the event of a contamination event on the Clackamas River that could require the plant to interrupt flows from the river into the plant.

Treatment Reliability (Treatment process):

The expanded plant will increase the ability of the plant to meet future, more stringent, treatment regulations.

Current – Although the 'direction filtration' plant has produced water meeting all current drinking water standards, urbanization within the watershed, agricultural practices, recreation and timber management can negatively affect water quality conditions in the Clackamas River. Working with public health officials and treatment experts from across the country, the Partnership learned that pesticides, herbicides, pharmaceuticals and personal care products will likely drive new, more stringent regulations for treated water quality. The current plant process will be challenged to meet these more stringent regulations.

Proposed - Replacing the direct filtration process with conventional treatment including ozone treatment will greatly enhance the ability of the plant to meet these future drinking water challenges. For over a century ozone has been used in the treatment of drinking water and has been proven to be effective at destroying:

- Taste and odor causing compounds in untreated water
- Algal toxins
- Synthetic organic compounds (herbicides/pesticides)
- Pharmaceuticals and personal care products

Because of the use of conventional treatment with ozone, the upgraded plant will produce water of superior quality year 'round. This will have a material benefit on supply and treatment reliability to the Partnership and the community of West Linn.

Operational Reliability:

The expanded plant will increase operational reliability and emergency response capability.

Current – The current drinking water plant is approaching 45-years old. Pumps, electrical, and mechanical equipment are increasingly unreliable and less energy efficient. When these pieces of equipment break down, due to their age replacement parts for equipment can be hard, if not

impossible, to find. This fact reduces plant operating reliability and contributes to diminished supply reliability.

Proposed – The upgraded water plant will incorporate modern electrical, mechanical and pumping equipment. This equipment will operate more quietly, reliably and efficiently reducing noise, energy use and operating expenses. More modern, reliable equipment will contribute to increased supply reliability, which will also benefit emergency response capacity.

10. The Lake Oswego Water Treatment Facility is located in West Linn, but does not provide regular water service to West Linn. Is this situation unique?

No, this is not unique. In the Portland Metropolitan area, the following facilities are located in towns or cities not served directly by the facility:

- City of Portland Bull Run Supply Reservoirs and Lusted Hill Treatment Facility – These facilities do not serve surrounding urban or rural areas.
- North Clackamas County Water Commission – has facilities located in Oregon City, but which serve Oak Lodge Water District, Sunrise Water Authority, and City of Gladstone.
- Joint Water Commission – has facilities located in Forest Grove, but which serve Hillsboro, Tualatin Valley Water District, and Beaverton.

11. Will the increased water withdrawals from the Clackamas River harm fish?

No. Increased water withdrawals under Lake Oswego's existing water permits have been carefully designed with advice from Oregon Department of Fish and Wildlife (ODFW) and the Water Resources Department to avoid adverse impacts to endangered salmon and steelhead. Under the Endangered Species Act (ESA) and new 'fish persistence' standards written into Oregon water law in 2007, the Partnership must manage its water withdrawals to avoid injury to protected fish stocks. Increased withdrawals will be subject to review and approval by several federal and state agencies charged with protecting fish, including:

- US Fish and Wildlife Service
- National Marine Fisheries Service
- Oregon Department of Fish and Wildlife
- Confederated Tribes of the Grand Ronde

The City is required to annually consult with ODFW and devise a plan for how to manage water withdrawals to ensure compliance with the City's extended permits. Moreover, the issue of impacts on fish by the use of the City of Lake Oswego's water rights was litigated in proceedings before the Oregon Water Resources Commission when it authorized the withdrawal up to 38 mgd in 2010. That decision in that case, though under appeal, is final and binding unless reversed by an appellate court. Incidentally, the objectors in that case did not ask for a stay of this order.

12. Will the Project harm other water rights holders on the River?

No. Pursuant to Oregon Water Law, additional withdrawals from the Partnership are prohibited from causing injury to other water rights holders on the Clackamas River who have more senior water rights. This obligation is the underlying tenet of the Prior Appropriation Doctrine that governs all water laws in Oregon and most western states and, which in essence says "First in time, first in right". This means the entity with the most senior water rights receives the water specified in their permit before the needs of the next most senior permit holder are met, and so on. This guarantees that the Partnerships increased withdrawals will not harm those with more senior permits.