



City of Tualatin

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"NECESSARY PARTIES"
MARKED BELOW

NOTICE OF APPLICATION SUBMITTAL

- ☐ ANNEXATION
 ☐ CONDITIONAL USE PERMIT
 ☐ PLAN TEXT AMENDMENT
☒ ARCHITECTURAL REVIEW
 ☐ PLAN MAP AMENDMENT
 ☐ OTHER:

CASE/FILE: AR-15-29

(Community Development Dept.: Planning Division)

PROPOSAL	To Expand Building D for Research & Development as well as Manufacturing

PROPERTY ☐ n/a	Name of Application	LAM BUILDING D EXPANSION		
	Street Address	11155 SW Leveton Drive		
	Tax Map and Lot No(s).	2S1 22CC 00 500		
	Planning District	Manufacturing Park (MP)	Overlays ☐	NRPO ☐ Flood Plain ☐
	Previous Applications	ANN-82-08 AR-00-30	Additional Applications: N/A	CIO N/A

DATES	Receipt of application	12/21/15	Deemed Complete	1/20/16	CONTACT	Name: Clare Fuchs
	Notice of application submittal			1/25/16		Title: Senior Planner
	Project Status / Development Review meeting			1/28/16		E-mail: cfuchs@ci.tualatin.or.us
	Comments due for staff report			2/8/2016		Phone: 503-691-3027
	Public meeting: ☐ ARB ☐ TPC ☒ n/a					Notes: TDC 62.020,62.021,62.060, 62.080,62.100,62.120,62.130,73.140,73.150,73.200, 73.210,73.240,73.260,73.340,73.360,73.370,73.380,73.390 also apply
	City Council (CC) ☒ n/a					

City Staff

- ☒ City Manager
☒ Building Official
☒ Chief of Police
☒ City Attorney
☒ City Engineer
☒ Community Dev. Director
☒ Community Services Director
☒ Economic Dev. liaison
☒ Engineering Associate*
☒ Finance Director
☒ GIS technician(s)
☒ IS Manager
☒ Operations Director*
☒ Parks and Recreation Coordinator
☒ Planning Manager
☒ Street/Sewer Supervisor
☒ Water Supervisor

Neighboring Cities

- ☐ Durham
☐ King City Planning Commission
☐ Lake Oswego
☐ Rivergrove PC
☐ Sherwood Planning Dept.

- ☐ Tigard Community Dev. Dept.
☐ Wilsonville Planning Div.

*Paper Copies

Counties

- ☐ Clackamas County Dept. of Transportation and Dev.
☒ Washington County Dept. of Land Use and Transportation (AR's)
☐ Washington County LRP (Annexations)

Regional Government

- ☒ Metro

School Districts

- ☐ Lake Oswego School Dist. 7J
☐ Sherwood SD 88J
☒ Tigard-Tualatin SD 23J (TTSD)
☐ West Linn-Wilsonville SD 3J

State Agencies

- ☐ Oregon Dept. of Aviation
☐ Oregon Dept. of Land Conservation and Development (DLCD) (via proprietary notice)
☐ Oregon Dept. of State Lands:

- ☐ Wetlands Program
☒ Oregon Dept. of Transportation (ODOT) Region 1
☐ ODOT Maintenance Dist. 2A
☐ ODOT Rail Div.

Utilities

- ☒ Republic Services
☒ Clean Water Services (CWS)
☒ Comcast [cable]*
☒ Frontier Communications [phone]
☒ Northwest Natural [gas]
☒ Portland General Electric (PGE)
☒ TriMet
☒ Tualatin Valley Fire & Rescue (TVF&R)
☒ United States Postal Service (USPS) (Washington; 18850 SW Teton Ave)
☐ USPS (Clackamas)
☒ Washington County Consolidated Communications Agency (WCCCA)

Additional Parties

- ☒ Tualatin Citizen Involvement Organization (CIO)

- ☒ 1.032: Burden of Proof
- ☒ 31.071 Architectural Review Procedure
- ☒ 31.074 Architectural Review Application Review Process
- ☐ 31.077 Quasi-Judicial Evidentiary Hearing Procedures
- ☐ Metro Code 3.09.045 Annexation Review Criteria
- ☐ 32.030 Criteria for Review of Conditional Uses
- ☐ 33.020 Conditions for Granting a Variance that is not a Sign or a Wireless Communication Facility
- ☐ 33.022 Criteria for Granting a Sign Variance
- ☐ 33.024 Criteria for Granting a Minor Variance
- ☐ 33.025 Criteria for Granting a Variance
- ☐ 34.200 Tree Cutting on Private Property without Architectural Review, Subdivision or Partition Approval, or Tree Removal Permit Prohibited
- ☒ 34.210 Application for Architectural Review, Subdivision or Partition Review, or Permit
- ☐ 34.230 Criteria (tree removal)
- ☐ 35.060 Conditions for Granting Reinstatement of Nonconforming Use
- ☐ 36.160 Subdivision Plan Approval
- ☐ 36.230 Review Process (partitioning)
- ☐ 36.330 Review Process (property line adjustment)
- ☐ 37.030 Criteria for Review (IMP)
- ☐ 40.030 Conditional Uses Permitted (RL)
- ☐ 40.060 Lot Size for Conditional Uses (RL)
- ☐ 40.080 Setback Requirements for Conditional Uses (RL)
- ☐ 41.030 Conditional Uses Permitted (RML)
- ☐ 41.050 Lot Size for Conditional Uses (RML)
- ☐ 41.070 Setback Requirements for Conditional Uses (RML)
- ☐ 42.030 Conditional Uses Permitted (RMH)
- ☐ 42.050 Lot Size for Conditional Uses (RMH)
- ☐ 42.070 Setback Requirements for Conditional Uses (RMH)
- ☐ 43.030 Conditional Uses Permitted (RH)
- ☐ 43.060 Lot Size for Conditional Uses (RH)
- ☐ 43.090 Setback Requirements for Conditional Uses (RH)
- ☐ 44.030 Conditional Uses Permitted (RH-HR)
- ☐ 44.050 Lot Size for Conditional Uses (RH-HR)
- ☐ 44.070 Setback Requirements for Conditional Uses (RH-HR)
- ☐ 49.030 Conditional Uses (IN)
- ☐ 49.040 Lot Size for Permitted and Conditional Uses (IN)
- ☐ 49.060 Setback Requirements for Conditional Uses (IN)
- ☐ 50.020 Permitted Uses (CO)
- ☐ 50.030 Central Urban Renewal Plan – Additional Permitted Uses and Conditional Uses (CO)
- ☐ 50.040 Conditional Uses (CO)
- ☐ 52.030 Conditional Uses (CR)
- ☐ 53.050 Conditional Uses (CC)
- ☐ 53.055 Central Urban Renewal Area – Conditional Uses (CC)
- ☐ 54.030 Conditional Uses (CG)
- ☐ 56.030 Conditional Uses (MC)
- ☐ 56.045 Lot Size for Conditional Uses (MC)
- ☐ 57.030 Conditional Uses (MUCOD)
- ☐ 60.040 Conditional Uses (ML)
- ☐ 60.041 Restrictions on Conditional Uses (ML)
- ☐ 61.030 Conditional Uses (MG)
- ☐ 61.031 Restrictions on Conditional Uses (MG)
- ☐ 62.030 Conditional Uses (MP)
- ☐ 62.031 Restrictions on Conditional Uses (MP)
- ☐ 64.030 Conditional Uses (MBP)
- ☐ 64.050 Lot Size for Permitted and Conditional Uses (MBP)
- ☐ 64.065 Setback Requirements for Conditional Uses (MBP)
- ☐ 68.030 Criteria for Designation of a Landmark
- ☐ 68.060 Demolition Criteria
- ☐ 68.070 Relocation Criteria
- ☒ 68.100 Alteration and New Construction Criteria
- ☒ 68.110 Alteration and New Construction Approval Process
- ☐ 73.130 Standards
- ☒ 73.160 Standards
- ☐ 73.190 Standards – Single-Family and Multi-Family Uses
- ☒ 73.220 Standards
- ☒ 73.227 Standards
- ☒ 73.230 Landscaping Standards
- ☐ 73.300 Landscape Standards – Multi-Family Uses
- ☒ 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses
- ☒ 73.320 Off-Street Parking Lot Landscaping Standards
- ☐ 73.470 Standards
- ☐ 73.500 Standards



City of Tualatin

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APPLICATION FOR ARCHITECTURAL REVIEW

Direct Communication to:			
Name: Suzannah Stanley		Title: Land Use Planner	
Company Name: Mackenzie			
Current address: 1515 SE Water Ave Ste 100			
City: Portland		State: OR	ZIP Code: 97214
Phone: 503-224-9560	Fax:	Email: sstanley@mcknze.com	
Applicant			
Name: Mike Halvorson		Company Name: Lam Research Corporation	
Address: 11155 SW Leveton Dr			
City: Tualatin		State: OR	ZIP Code: 97062
Phone: 503-685-8345	Fax:	Email: michael.halvorson@lamresearch.com	
Applicant's Signature: <i>Michael Halvorson</i>		Date: 12/18/15	
Property Owner			
Name: Same as applicant			
Address:			
City:		State:	ZIP Code:
Phone:	Fax:	Email:	
Property Owner's Signature:		Date:	
(Note: Letter of authorization is required if not signed by owner) Signed by owner above, not required			
Architect			
Name: Peter Alto			
Address: 1515 SE Water Ave Ste 100			
City: Portland		State: OR	ZIP Code: 97214
Phone: 503-224-9560	Fax:	Email: palto@mcknze.com	
Landscape Architect			
Name: Ron Heiden			
Address: 1515 SE Water Ave Ste 100			
City: Portland		State: OR	ZIP Code: 97214
Phone: 503-224-9560	Fax:	Email: rheiden@mcknze.com	
Engineer			
Name: Brent Nielsen			
Address: 1515 SE Water Ave Ste 100			
City: Portland		State: OR	ZIP Code: 97214
Phone: 503-224-9560	Fax:	Email: bnielsen@mcknze.com	
Project			
Project Title: Lam Building D Expansion			
Address: 11155 SW Leveton Dr			
City: Tualatin		State: OR	ZIP Code: 97062
Brief Project Description: 18,140 SF expansion to existing Building D on Lam Research campus			
Proposed Use: R&D, manufacturing			

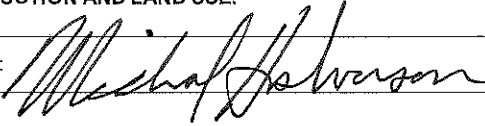
\$8 million

Value of Improvements:

\$8 million

AS THE PERSON RESPONSIBLE FOR THIS APPLICATION, I HEREBY ACKNOWLEDGE THAT I HAVE READ THIS APPLICATION AND STATE THAT THE INFORMATION ABOVE, ON THE FACT SHEET, AND THE SURROUNDING PARTY OWNER MAILING LIST IS CORRECT. I AGREE TO COMPLY WITH ALL APPLICABLE CITY AND COUNTY ORDINANCES AND STATE LAWS REGARDING BUILDING CONSTRUCTION AND LAND USE.

Applicant's Signature:



12/18/15

Date: 12/18/15

Office Use

Case No:	Date Received:	Received by:
Fee: Complete Review :	Receipt No:	
Application Complete as of:	ARB hearing date (if applicable):	
Posting Verification:	6 copies of drawings (folded)	
1 reproducible 8 1/2" X 11" vicinity map	1 reproducible 8 1/2" X 11" site, grading, LS, Public Facilities plan	
Neighborhood/Developer meeting materials		

Revised: 6/12/14

GENERAL INFORMATION	
Site Address:	11155 SW Leveton Dr
Assessor's Map and Tax Lot #:	2S122AB 00100
Planning District:	MP
Parcel Size:	1,002,384 SF
Property Owner:	Lam Research Corporation
Applicant:	Lam Research Corporation
Proposed Use:	R&D and manufacturing

ARCHITECTURAL REVIEW DETAILS	
Residential ☐ Commercial ☒ Industrial ☐	
Number of parking spaces:	-7 (Current: 854. After expansion: 847)
Square footage of building(s):	18,140 SF (expansion)
Square footage of landscaping:	In affected area: 17,600 SF
Square footage of paving:	In affected area: 17,245 SF
Proposed density (for residential):	

For City Personnel to complete: Staff contact person:
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Architectural Review (AR) Intake Check List

Project Name: Lam Building D Expansion

AR- - **Date Received** **Submittal #**

- ☒ Project name or title that matches CRW scoping/pre-application meeting name. (Names should be somewhat descriptive of the project i.e. ABC Company New Building).
- ☒ Include page numbers, a Table of Contents, and staple documents or put documents in a binder. Do not use binder clips or paper clips.
- ☒ Plans should have page numbers and an Index to Sheets that matches page numbers. All symbols, line types, and textures must have a legend. Please direct to page of legend on each sheet. Plans should be stapled down the length of the left side.
- ☒ Application shall contain the names, addresses, e-mails, and telephone numbers of:

<u> X </u> Property Owner(s)	<u> X </u> Applicant	<u> X </u> Project Planner
<u> X </u> Architect	<u> x </u> Engineer	<u> x </u> Landscape Architect
- ☒ Signatures from Property Owner(s) and the Applicant– along with printed name and date.
- ☒ Street Address(s), Tax Lot Number(s), and current tax map(s).
- ☒ Clean Water Services (CWS) Service Provider Letter (SPL) indicating a “Stormwater Connection Permit Authorization Letter” will likely be issued or Pre-Screen signed by CWS with appropriate box checked to indicate that it serves as an SPL.
- ☐ Wetland delineations and floodplain, if applicable
- ☐ Fill/Removal Permit Issued by the Oregon Division of State Lands (DSL) and the U.S. Army Corps of Engineers, if applicable
- ☒ Application Fee (must be paid at time of first submittal).
- ☒ 3 plan sets of the following plans:
 - Existing Conditions Plan
 - Site Plan
 - Grading Plan
 - Landscape Plan
 - Elevations including specifications as to type, color, and texture of exterior surfaces of proposed structures (scale of 1/16": 1', 1/8":1', 1/4":1', 1/2". 1", 3/4".1")
 - Tree Preservation Plan
 - All plan sets shall be collated, stapled and folded and shall include a north arrow, scale and legend corresponding to symbols on the plans.
 - Scale for Existing Conditions, Site Plan, Grading, Landscape and Tree Preservation shall be 1":10', 1":20", 1":30", for larger developments 1":40' or 1":50'. Adjust the scale accordingly on ledger (11x17) and letter (8.5x11) size copies.
 - 3 sets of 8 1/2" x11", 11"x17", 24"x36"
 - Attachment 1 to this check list contains detailed plan requirements for each of the above

- ☐ Not applicable; no changes to public facilities
- ☐ Public Utility Facility Plan (Per Tualatin Development Code Ch. 74) including the following information:
- show the location type, size, and grade of all existing and proposed utility facilities such as: sanitary and storm sewers, water lines, fire hydrants, streets and sidewalks, and water quality facilities.
 - Water quality, detention, and conveyance calculations and plans. (Soils report will also be required if soils type used for drainage calculations).
 - Traffic study information as required by the City Engineer- 4 copies
 - Other utility facilities as required by the City Engineers such as a fire flow test
 - All plan sets shall be collated, stapled and folded and shall include a north arrow, scale and legend corresponding to symbols on the plans.
 - Scale shall be 1":10', 1":20", 1":30", for larger developments 1":40' or 1":50'. Adjust the scale accordingly on ledger (11x17) and letter (8.5x11) size copies.
 - 3 sets of 8 ½" x11", 11"x17", 24"x36"
 - Attachment 1 to this check list contains detailed plan requirements.
- ☐ Developments in the Central Design District shall provide the Neighborhood Meeting notes and evidence of the notice posting required in TDC 31.071(5) and shall provide narratives statements considering each of the Design Guidelines in TDC 73.610 Narrative, (TDC Fig. 73-4 maps this district)
- ☒ Completed City fact sheet on the project
- ☒ A letter from the franchise solid waste and recycling hauler reviewing the proposed solid waste and recyclables method and facility signed and dated by a designee of the hauler. Attach a site plan and elevations of trash enclosures signed and dated by the hauler, if applicable.
- ☐ Acoustical engineer report as required by the Community Development Director
- ☒ Neighborhood Meeting information including the following:
- Mailing affidavit and
 - Sign Posting certification on current City forms;
 - attendance log and notes;
 - copy of Neighborhood Meeting invitation;
 - GIS buffer map and mailing list including CIO contacts and mailing labels.
 - Neighborhood Meeting must have occurred no more than 180 days from date of first submittal.
 - Pursuant to TDC 31.063
- ☐ Indication of a railroad (RR) at-grade crossing that provides sole access to the subject property, if applicable.
- ☒ Land Use application notification information including:
- Provide a list of mailing list recipients pursuant to TDC 31.064(1)

- Post a sign pursuant to TDC 31.064(2)
- Sign and dated posting certification with given case file number on current City Form.

- ☒ Narrative containing responses to the applicable criteria in the Tualatin Development and Municipal Code.
- ☒ Evidence of completed pre-application and scoping meeting with dates (no older than 180 days from date of 1st submittal).
- ☒ Adobe PDF(s) of application materials (direct conversions, not scans) on a CD or USB flash drive.
- ☒ Lighting Plan with “scattered” photometrics, light specs, and a legend. All photometric measurements must be shown covering all subject site property lines and the entire subject site. All light specs must show lights that are full cut off. Photometric measurement labels must be large enough to read.
No changes proposed within 400' of adjacent properties or streets

Application Re-Submittals:

- ☐ Revisions to application must include date of resubmission on all new and revised materials. Provide a response letter addressing each incomplete item and on what page the missing information can be found. Please submit 3 copies of an entire new packet, not just the revised and new materials, in paper and electronic format. Please organize the new and revised materials and put them in the appropriate places in the application.

Please provide 3 full paper copies of every piece of the application for completeness review. During every completeness review staff will retain at least one paper copy of the submission for the record. Additional copies may be slip sheeted for resubmission at the staff member's discretion.

After the application is deemed complete, the project planner will request the appropriate number of complete application paper copies.

Revised date August 17, 2015

Architectural Review (AR) Intake Check List
PLAN REQUIREMENTS

Project Name: Lam Building D Expansion

AR-____ -____ **Date Received**____ **Submittal #** _____

PROPOSED SITE PLAN AND EXISTING CONDITIONS PLAN:

- North arrow and scale of drawing (Scale 1":10', 1":20', 1":30', for larger developments 1":40' or 1":50'). Adjust the scale accordingly on ledger (11 x 17) and letter (8.5 x 11) size copies.
- Site Data to include Planning District designation, square footage of site, square footage of development area, square footage of landscaping, square footage of parking lot landscaping, square footage of pavement, number of parking spaces (standard, subcompact and disability), square footage of building (gross and perimeter). Information must contain existing and proposed square footage of parking spaces. Identify landscape credits available and building setback reduction.
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show delineated wetland boundary, top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Location of buildings and main building entrance, dimensions and square footage of existing and proposed development, including setback distances to property lines and setback distances between buildings. Include location of bicycle parking and covered bicycle parking.
- Location of accessways, walkways and on-site bikeways.
- Fronting street(s), right-of-way lines, driveways, sidewalks, curbs, paths, railroad right-of-way, bicycle paths, pedestrian paths, transit stop locations and easements (include dimensions).
- Parking circulation and loading areas (dimensions of spaces) and type of surface. Show entrances, exits, direction of traffic flow, maneuvering areas and setbacks. Indicate location of subcompact spaces, vanpool and car pool parking and type of curbing. Identify disability stall locations and stall dimensions.
- Location of fences, walls, trash enclosures, recycling areas, electric transformer pads, rooftop mechanical equipment and exterior light fixtures.
- Outdoor storage areas and future development areas, if applicable.
- Include all property lines and easements based on survey or other recorded county documents.
- Include all proposed building envelopes.

GRADING PLAN:

- North arrow and scale of drawing (scale 1":10', 1":20', 1":30').
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, delineated wetland boundary, wetland natural areas and open space natural areas, and CWS vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.

- Show site contour lines and elevations (existing and proposed, referenced from mean sea level. Minimum five-foot contours).
- Location, size and species of all existing trees having a trunk diameter of 8" or greater measured at a point 4' above the ground. Indicate trees to be removed or retained.
- Place a note on the plan stating that existing trees to be retained shall be fenced around the drip line with chain link or other sturdy fencing during construction. Indicate topsoil replacement in all landscape areas.
- Location, size and grading plan of water quality facility, if applicable.

TREE PRESERVATION PLAN:

- Tree Preservation Site Plan (drawn to scale 1:10, 1:20, or 1:30), including a north arrow, existing and proposed property lines, existing and proposed topographical contour lines (existing to remain and proposed structure envelopes), structures, impervious surfaces, wells, septic systems, stormwater retention/detention facilities, utility and access locations/easements, vision clearance areas, and all trees having a trunk diameter of 8" or greater as measured at a point 4' above the ground. All trees proposed for removal and all trees proposed for preservation shall be indicated on the site plan as such by identifying symbols. For each tree illustrated, include information on size, species, and tag i.d. number.
- A Tree Assessment Report, prepared by a qualified arborist, including the following information: an analysis as to whether trees proposed for preservation can in fact be preserved in light of the development proposed, are healthy specimens, and do not pose an imminent hazard to persons or property if preserved; an analysis as to whether any trees proposed for removal could be reasonably preserved in light of the development proposed and health of the tree; a statement addressing the tree removal approval criteria set forth in TDC 34.230; and arborist's signature and contact information. The Tree Assessment Report shall have been prepared no more than one calendar year preceding the date the Architectural Review application is deemed complete by the City.
- Tagging. All trees on-site shall be physically identified and numbered in the field with an arborist-approved tagging system. The tag i.d. numbers shall correspond with the tag i.d. numbers illustrated on the Tree Preservation Site Plan.
- Where Clean Water Services (CWS) has approved delineation of a "sensitive area" or "vegetated corridor" on the subject property, and CWS has required dedication of an easement that prohibits encroachment into the delineated area, and the CWS-required easement boundary is clearly illustrated and identified on the site plan, then all trees located within the CWS-required easement need not be individually identified on the Tree Preservation Site Plan, need not be addressed in the Tree Assessment Report, and need not be tagged.

ELEVATIONS:

- Color elevations. View of proposed structures drawn at scale of 1/16":1', 1/8":1', 1/4":1' (buildings, covered bicycle parking and mixed solid waste and source separated recyclable storage areas).
- Scaled elevations. View of exterior light fixtures, electrical transformer pads, and rooftop mechanical equipment.
- Colored elevation views shall include specifications as to materials and colors to be used in the development, including walls, roof, windows, doors, garages and trim.
- Cut sheet of exterior lighting units showing down deflecting lighting pattern. Include parking lot pole-mounted lighting and wall-mounted lights.
- Plans drawn at scale of 1/16":1', 1/8":1' or 1/4":1'.

LANDSCAPE PLAN:

- North arrow and scale of drawing (scale of 1":10', 1":20', 1":30').

- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Specific locations of all proposed and existing landscaping, including greenway landscaping (if applicable). Identify location of sensitive area buffer landscaping.
- Location, size and species of all existing trees having a trunk diameter of 8" or greater as measured at a point 4' above the ground. Designate trees to be removed or retained. When trees are to be retained, please put tree protection measures on both the Grading and Landscape plans.
- Take-off sheet table indicating square footage of landscaping. Indicate square footage of landscape islands in parking lot.
- Plant legend which includes:
 - Total percentage and square footage of landscaped areas.
 - Square footage of parking lot landscaping.
 - Common and botanical names of plants.
 - Quantity and spacing of plants.
 - Size of plants (caliper, height or container size).
 - Landscaping materials to be used (bark dust, river rock, etc.).
 - Notation on type of irrigation system (automatic underground or drip).
 - Replacement of topsoil.
 - Location of street trees.

PUBLIC FACILITIES PLAN:

- North arrow and scale of drawing (scale of 1":10', 1":20', 1":30').
- Correct lot area and lot line dimensions of the site. Correct location of Natural Resource Protection Overlay District, including greenways, wetland natural areas and open space natural areas, and 25' vegetated corridors adjacent to a sensitive area. Also show top of bank and centerline for rivers and creeks. Indicate if wetlands or greenways are proposed to be dedicated.
- Street - existing and proposed. Show centerline, right-of way lines, dimensions, sidewalks, and curbs, bike lanes, accessways, walkways, landscape strips, signalized intersections and nearby transit stops.
- Water - show existing and proposed water lines, fire hydrants, meters, line sizes, easements, public or private lines.
- Sanitary Sewer - existing and proposed. Sewer lines laterals, manholes and cleanouts, line sizes, easements, public or private line.
- Flood Plain - If applicable, show 100-year flood plain and/or floodway boundaries.
- Storm Sewer - existing and proposed. Storm lines, catch basins, manholes, line sizes, easement, public or private line.
- Calculations supporting the water quality facility design.
- Traffic Study Information - as required by City Engineer (5 copies).
- Identify greenway areas, bicycle paths and pedestrian paths.
- Location of all signs within the public right-of-way adjacent to the parcel.

CITY OF TUALATIN FACT SHEET

General

Proposed use: R&D and manufacturing			
Site area: 57.99	acres	Building footprint: 18,140 (expansion)	sq. ft.
Development area: 1.22	acres	Paved area: 17,245 (in affected area)	sq. ft.
52,985	Sq. ft.	Development area coverage new bldg area: 0.72% (of whole site)	

Parking

Spaces required (see TDC 73.400) (example: warehouse @ 0.3/1000 GFA) IMP- @ 1.6 /1000 GFA = 885 approved @ /1000 GFA = @ /1000 GFA = Total parking required: 885 spaces Handicapped accessible = 89 Van pool = 33 Compact = (max. 35% allowed) = none exist or proposed Loading berths = 3	Spaces provided: Total parking provided: 847 spaces Standard = 779 Handicapped accessible = 24 Van pool = 18 Compact = 0 Loading berths = No change Approximately 15
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Bicycles

Covered spaces required: 17	Covered spaces provided: No change
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Landscaping

Landscaping required: 20 % of dvpt. area (Lot 2 only) 170,427.4 Square feet	Landscaping provided: 40.4% of dvpt. area 344,829 Square feet
Landscaped parking island area required: 71.25 sq. ft. per stall	Landscaped parking island area provided: N/A, no parking proposed

Trash and recycling facility

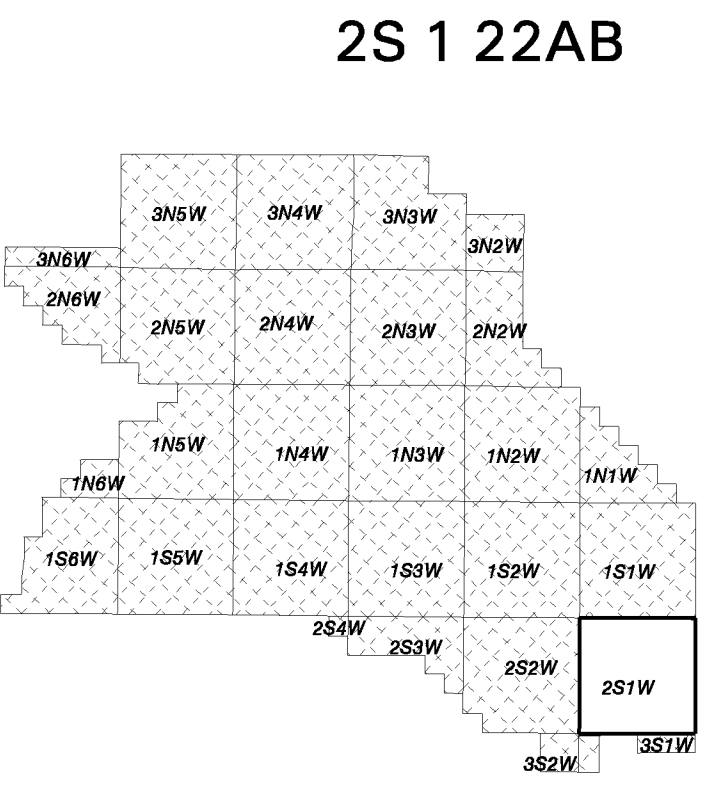
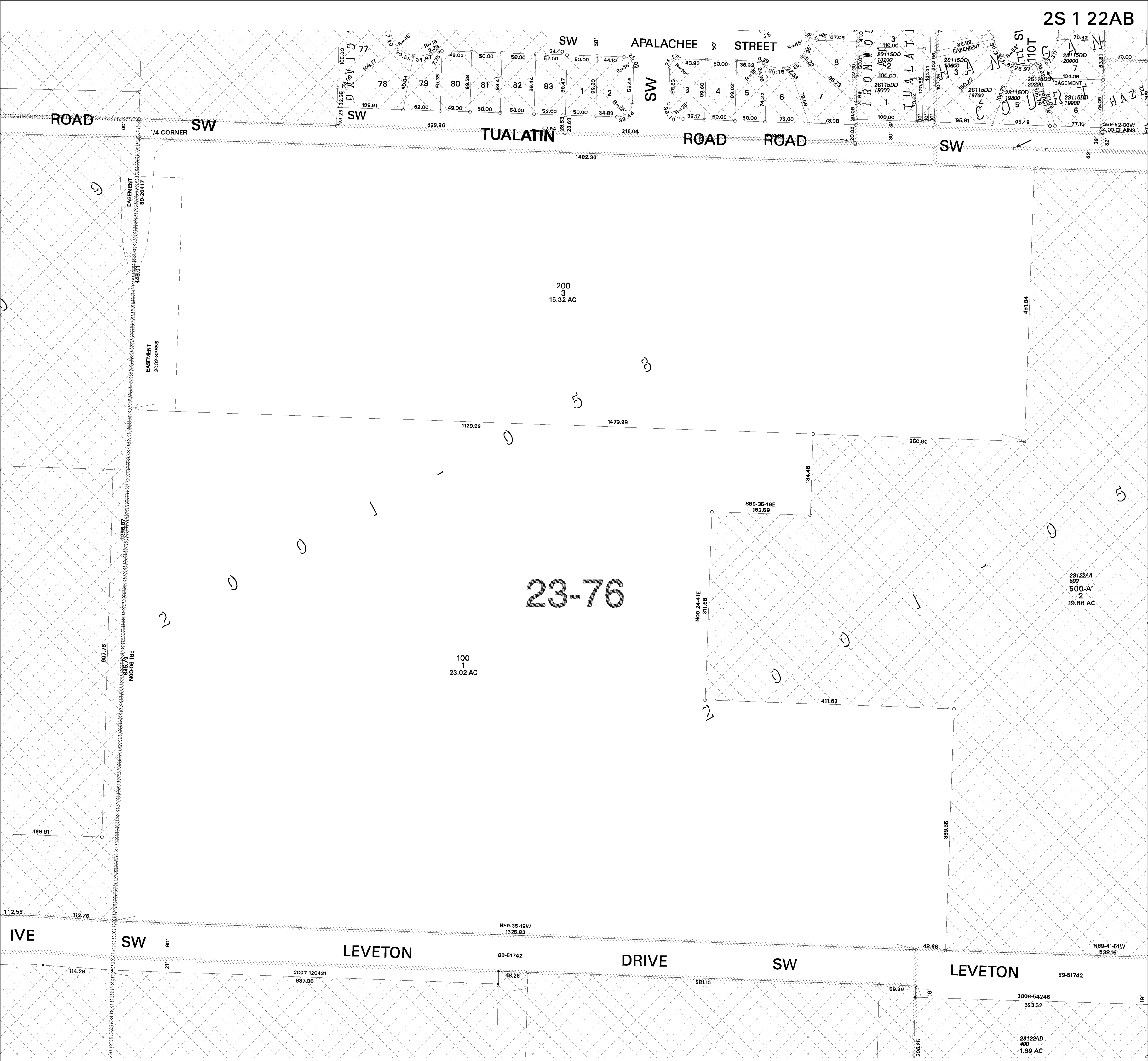
Minimum standard method: 109 square feet	provided in existing facilities
Other method:	square feet

For commercial/industrial projects only (building expansion)

Total building area: 18,140	sq. ft.	2 nd floor:	N/A sq. ft.
Main floor: 18,140	sq. ft.	3 rd floor:	N/A sq. ft.
Mezzanine: N/A	sq. ft.	4 th floor:	N/A sq. ft.

For residential projects only

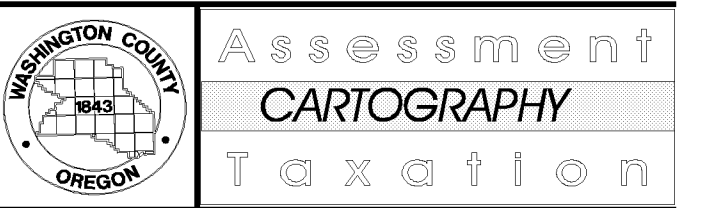
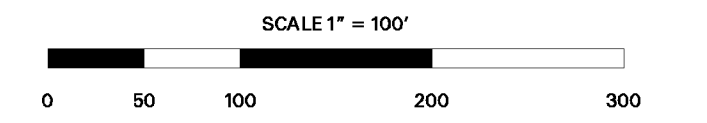
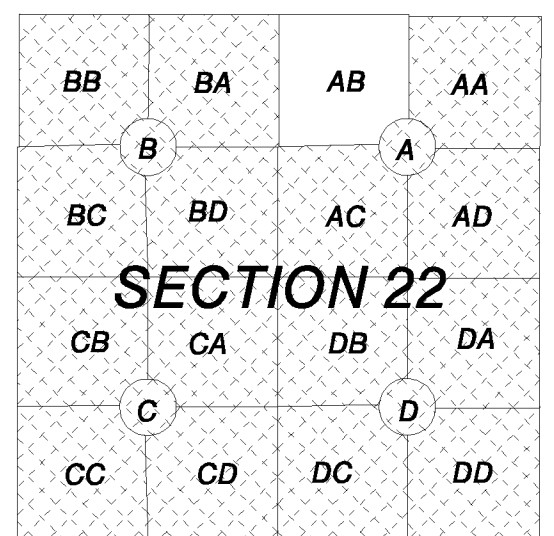
Number of buildings:	Total sq. ft. of buildings:	sq. ft.
Building stories:		



WASHINGTON COUNTY OREGON
NW1/4 NE1/4 SECTION 22 T2S R1W W.M.
SCALE 1" = 100'

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT
www.co.washington.or.us



PLOT DATE: June 25, 2010
FOR ASSESSMENT PURPOSES ONLY - DO NOT RELY ON FOR OTHER USE
Map areas delineated by either gray shading or a cross-hatched pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.



Clean Water Services File Number

15-004095

Sensitive Area Pre-Screening Site Assessment1. Jurisdiction: Tualatin

2. Property Information (example 1S234AB01400)

Tax lot ID(s): 2S122AB00100Site Address: 11355 SW LEVETON DRCity, State, Zip: Tualatin, OR 97062Nearest Cross Street: SW 108th Ave

3. Owner Information

Name: _____

Company: LAM RESEARCH CORPORATIONAddress: 11355 SW LEVETON DRCity, State, Zip: Tualatin, OR 97062

Phone/Fax: _____

E-Mail: _____

4. Development Activity (check all that apply)

- ☐ Addition to Single Family Residence (rooms, deck, garage)
☐ Lot Line Adjustment ☐ Minor Land Partition
☐ Residential Condominium ☐ Commercial Condominium
☐ Residential Subdivision ☐ Commercial Subdivision
☐ Single Lot Commercial ☐ Multi Lot Commercial

Other _____

Addition to manufacturing/R&D facility

5. Applicant Information

Name: Suzannah StanleyCompany: MackenzieAddress: 1515 SE Water Ave Ste 100City, State, Zip: Portland, OR 97214Phone/Fax: 503-224-9560E-Mail: sstanley@mcknze.com6. Will the project involve any off-site work? ☐ Yes ☒ No ☐ Unknown

Location and description of off-site work _____

7. Additional comments or information that may be needed to understand your project _____

Phased project: early utilities, excavation/grading, shoring, foundation, then building. Plz OK all.

This application does NOT replace Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

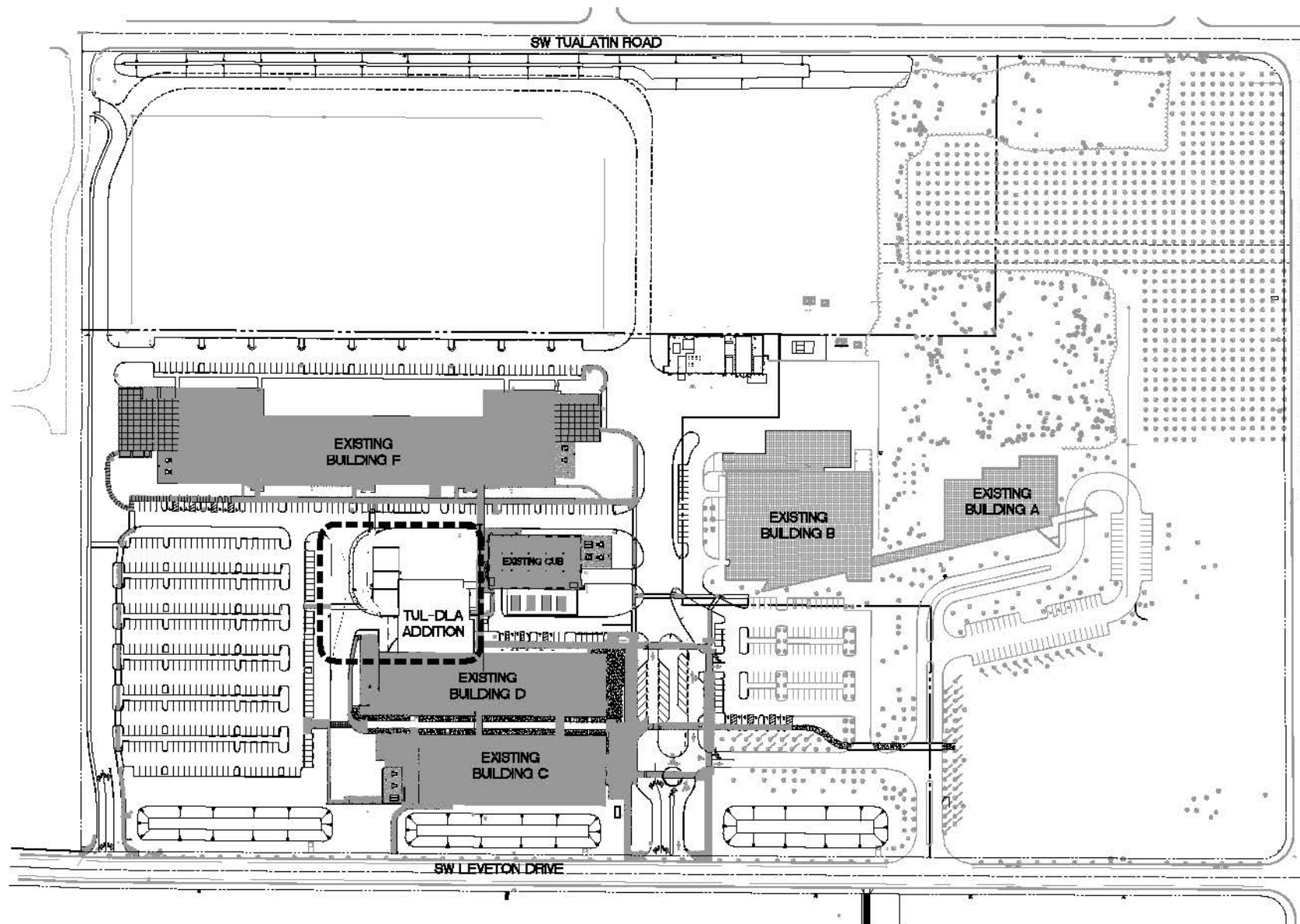
By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/Type Name Suzannah StanleyPrint/Type Title Land Use Planner**ONLINE SUBMITTAL**Date 12/17/2015**FOR DISTRICT USE ONLY**

- ☐ Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.
- ☐ Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.
- ☐ Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does NOT eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, state and federal law.
- ☐ This Service Provider Letter is not valid unless _____ CWS approved site plan(s) are attached.

X The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2); NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

See 2001-058 platReviewed by Laurie Harris Date 12/18/15



OVERALL SITE PLAN



M.
Architecture - Interiors
Planning - Engineering

Portland, OR
503.251.8900
Vancouver, WA
360.683.0700
Seattle, WA
206.462.0000
www.mackenzie.com

MACKENZIE.
CREATING VALUE THROUGH DESIGN

Client

Lam
RESEARCH

Project
DLA TUALATIN
BUILDING D
ADDITION

11857 SW LEVETON DR
TUALATIN, OR 97062

DATE: 8/26/2015
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OR REPRODUCED IN ANY MANNER
WITHOUT PRIOR WRITTEN PERMISSION

REVISIONS:

BY: JENNY BURNETT
DATE: 8/26/2015

SHEET TITLE:

OVERALL
SITE PLAN

DRAWN BY: ELI

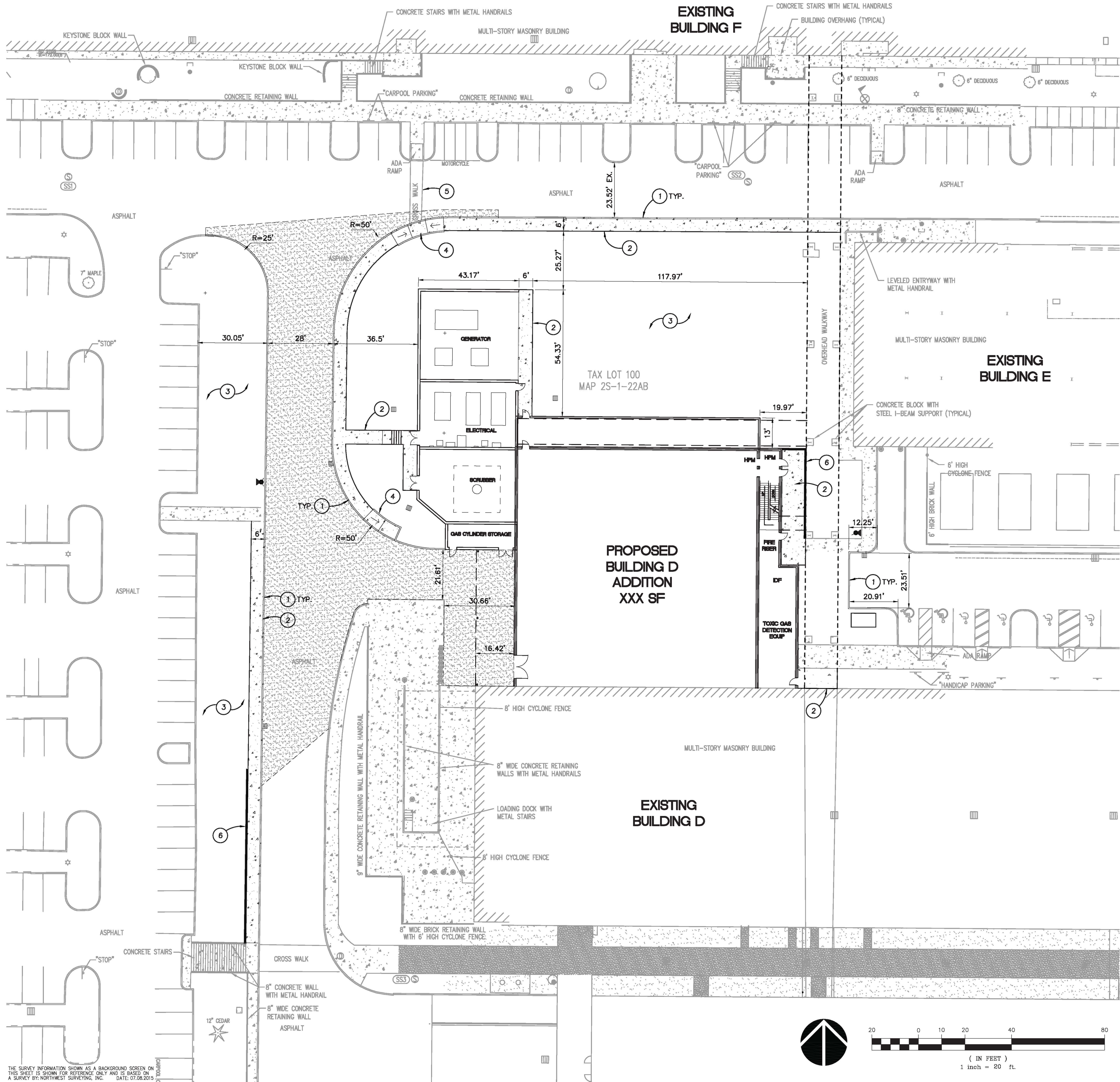
CHECKED BY: PPA

SHEET:

A1.0

JOB NO. 2150163.00

PRELIMINARY ONLY - 9/28/15



LEGEND

- AC PAVING
- CONCRETE SIDEWALK
- VERTICAL CURB
- SAWCUT
- CATCH BASIN
- FIRE HYDRANT
- WATER VALVE
- THRUST BLOCK
- PROPOSED LIGHTPOLE
- EXISTING LIGHTPOLE
- RETAINING WALL

GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND THE REQUIREMENTS OF THE CITY OF TUALATIN, CLEAN WATER SERVICES (CWS), AND THE CURRENT AMERICAN PUBLIC WORKS ASSOCIATION STANDARDS FOR PUBLIC WORKS CONSTRUCTION.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF THERE ARE ANY DISCREPANCIES.
- EFFECTIVE EROSION PREVENTION AND SEDIMENT CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED TO MEET CWS REQUIREMENTS. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
- EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE ROUTED SO THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
- CONTRACTOR SHALL ADJUST ALL STRUCTURES IMPACTED BY CONSTRUCTION IMPROVEMENTS TO NEW FINISH GRADES.
- EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 757.541 THROUGH 757.571; EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS SEVENTY-TWO (72) HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. (ONE CALL LOCATE UTILITY NOTIFICATION CENTER - PORTLAND METRO AREA 246-6699, OREGON 696-4848, ALL OTHER AREAS 1-800-332-2344).
- WHERE CONNECTING TO AN EXISTING PIPE, AND PRIOR TO ORDERING MATERIALS, THE CONTRACTOR SHALL EXPOSE THE END OF THE EXISTING PIPE VERIFY THE LOCATION, SIZE, AND ELEVATION. NOTIFY ENGINEER OF ANY DISCREPANCIES.
- REQUEST BY THE CONTRACTOR FOR CHANGES TO THE PLANS MUST BE APPROVED BY THE ENGINEER.
- PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES

KEYNOTES:

- CONCRETE VERTICAL CURB
- CONCRETE SIDEWALK
- LANDSCAPE AREA, SEE LANDSCAPE PLANS
- CURB RAMP
- REPLACE EXISTING ACCESSIBLE CROSS WALK
- C.I.P. CONCRETE RETAINING WALL, MAX HEIGHT X'

SITE COVERAGE SUMMARY:

	EXISTING	PROPOSED
LANDSCAPE	XX,XXX SF	XX,XXX SF
PARKING AND SIDEWALK	XX,XXX SF	XX,XXX SF
BUILDING	XX,XXX SF	XX,XXX SF



Architecture • Interiors
Planning • Engineering

Portland, OR
503.224.9560
Vancouver, WA
360.695.7879
Seattle, WA
206.749.9993
www.mcknze.com

MACKENZIE.

Client



Project
DLA TUALATIN
BUILDING D
ADDITION

11357 SW LEVETON DR
TUALATIN, OR 97062

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REVISIONS:

NO.	REVISIONS	REVISION DATE	DELTA
1	REVISED THIS SHEET		
2			
3			
4			
5			
6			
7			
8			
9			
10			

SHEET TITLE:
SITE PLAN

DRAWN BY: NKL

CHECKED BY: BDN

SHEET:

C2.1

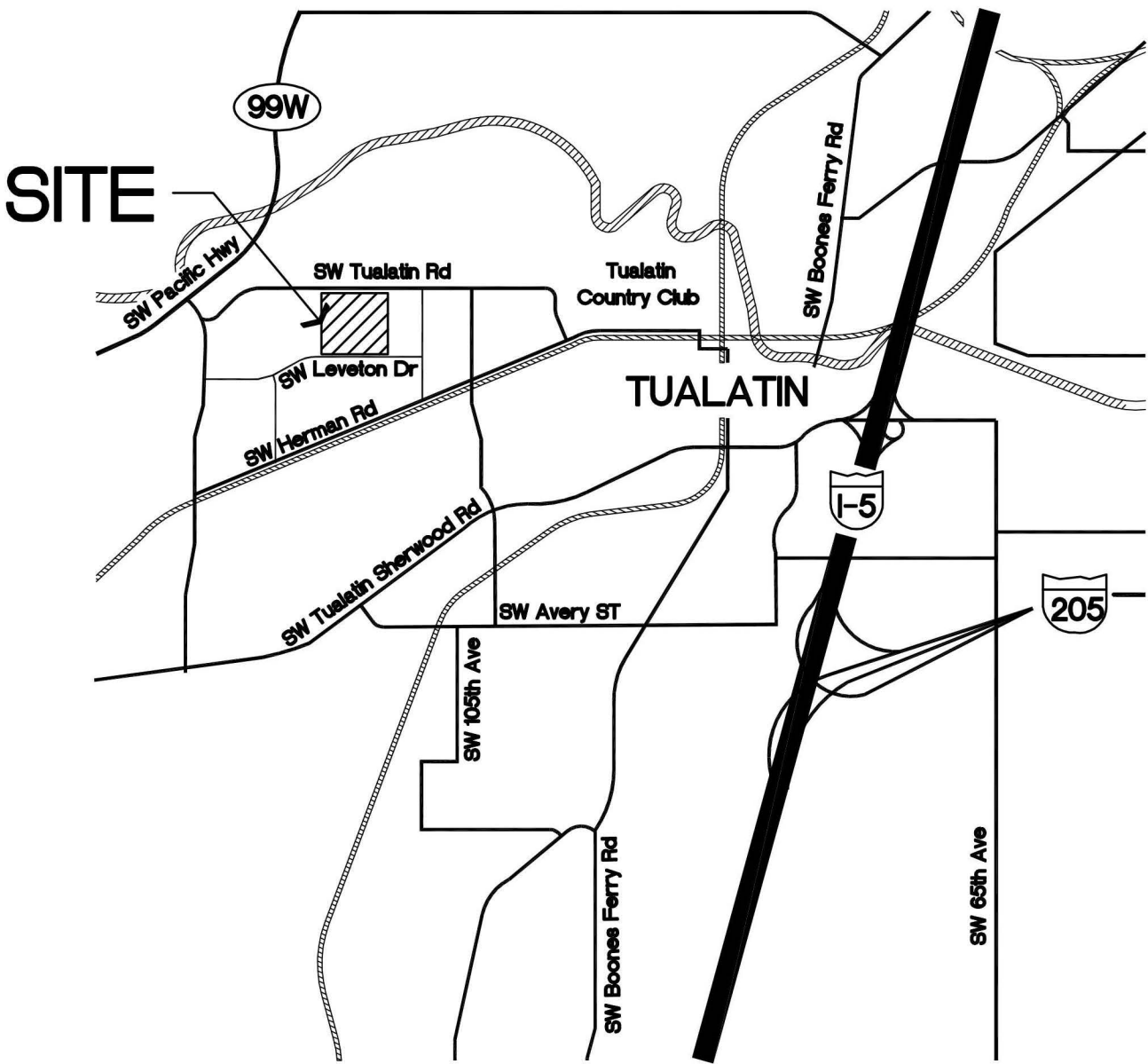
JOB NO. 2150163.00

DRAFT PRELIMINARY ONLY - 12/15/15

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: NORTHWEST SURVEYING, INC. DATE: 07.08.2015

LAM RESEARCH CORP.

BUILDING D EXPANSION
DESIGN REVIEW - 12/18/15



1 T1.1 VICINITY MAP
NTS

ABBREVIATIONS

AB	ANCHOR BOLT	ELEV	ELEVATION	INSUL	INSULATION	R	RADIUS
AC	ASPHALTIC CONCRETE	ELECT	ELECTRICAL	INT	INTERIOR	RAD	RADIAL
ACT	ACOUSTICAL CEILING TILE	EN	EDGE NAIL	JNT	JOINT	RBE	ROOF BASE ELEVATION
ADJ	ADJACENT / ADJUSTABLE	ENGR	ENGINEER	JST	JOIST	RCP	REFLECTED CEILING PLAN
ADA	AMERICANS WITH DISABILITIES ACT	EOP	EDGE OF PANEL			RD	ROOF DRAIN
ADD'L	ADDITIONAL	EPDM	ETHYLENE PROPYLENE DIENE MONOMER	L	ANGLE	REF	REFERENCE / REFRIGERATOR
AEG	ALUMINUM ENTRANCE GRILLE	EQ	EQUAL	LAM	LAMINATE	REINF	REINFORCING
AFF	ABOVE FINISH FLOOR	ETC	EPOXY TRAFFIC COATING / ETCETERA	LAV	LAVATORY	REQ'D	REQUIRED
ALT	ALTERNATE	EW	EACH WAY	LB	LAS BOLT	REV	REVISION
APPROX	APPROXIMATE	EX/EXIST	EXISTING	LL	LIVE LOAD	RF	RESILIENT FLOORING
ARCH	ARCHITECT(URAL)	EXP JT	EXPANSION JOINT	LLV	LONG LEG VERTICAL	RM	ROOM
		EXT	EXTERIOR	LONGIT	LONGITUDINAL	RO	ROUGH OPENING
				LP	LOW POINT	ROW	RIGHT OF WAY
				LWC	LIGHTWEIGHT CONCRETE		
B/	BOTTOM OF	F/	FACE OF	M	MIRROR	SCHED	SCHEDULE
BATT	BATTEN INSULATION	FB	FLAT BAR	M/E/P	MECHANICAL/ELECTRICAL/PLUMBING OR PROCESS	SC	SEALED CONCRETE
BD	BOARD	FC	FACE OF CURB			SCM	STRUCTURAL CLAY MASONRY
BTWN	BETWEEN	FD	FLOOR DRAIN	MAS	MASONRY	SF	SQUARE FEET
BLDG	BUILDING	FDC	FIRE DEPARTMENT CONNECTION	MATL	MATERIAL	SHTG	SHEATHING
BLK	BLOCK	FE	FIRE EXTINGUISHER	MAX	MAXIMUM	SIM	SIMILAR
BLKG	BLOCKING	FFE	FINISH FLOOR ELEVATION	MB	MACHINE BOLT	SLEC	SELF LEVELING EPOXY COATING
BM	BENCH MARK / BEAM	FIN	FINISH(ED)	MDF	MEDIUM DENSITY FIBERBOARD	SLV	SHORT LEG VERTICAL
BN	BOUNDARY NAIL	FL	FLOOR	MDO	MEDIUM DENSITY OVERLAY	SMS	SHEET METAL SCREW
BOTT	BOTTOM	FLR	FLOOR	MECH	MECHANICAL	SP	SPACE(D)S
BRG	BEARING PLATE	FOC	FACE OF CONCRETE	MFD	MANUFACTURED	SPEC(S)	SPECIFICATION(S)
BSMT	BASEMENT	FM	FACTORY MUTUAL	MFG	MANUFACTURING	SQ	SQUARE
BTWN	BETWEEN	FN	FIELD NAILING	MFR	MANUFACTURER	SS	STAINLESS STEEL
		FND	FOUNDATION	MGR	MANAGER	ST	STONE
CAB	CABINET	FOC	FACE OF CONCRETE	MH	MAN HOLE	STA PT	STATION POINT
CB	CATCH BASIN	FOF	FACE OF FINISH	MIN	MINIMUM	STAGD	STAGGERED
CI	CAST IRON	FOIC	FURNISH BY OWNER INSTALL BY CONTRACTOR	MISC	MISCELLANEOUS	STD	STANDARD
CJ	CONTROL JOINT	FOM	FACE OF MASONRY	MK	MARK	STIFF	STIFFENER
CLNG	CEILING	FOS	FACE OF STUD	MLP	METAL LINEAR PANEL	STL	STEEL
CLR	CLEAR	FOW	FACE OF WALL	MO	MASONRY OPENING	STRUCT	STRUCTURAL
CMP	CORRUGATED METAL PIPE	FS	FAR SIDE	MP	METAL PANEL	SUSP	SUSPENDED
CMU	CONCRETE MASONRY UNIT	FTG	FEET/FOOT / FIRE TREATED FOOTING	MTL	METAL	SVC	SHEET VINYL COVED
CTR	CENTER	FWC	FABRIC WALL COVERING	NFPA	NATIONAL FIRE PROTECTION AGENCY	T&B	TOP AND BOTTOM
CO	CLEAN OUT	GA	GAUGE	NIC	NOT IN CONTRACT	T/	TEMP
COL	COLUMN	GB	GRAB BAR	NO./#	NUMBER	THK	THICK(NESS)
CONC	CONCRETE	GEN	GENERAL	NOM	NOMINAL	TL	TOTAL LOAD
CONF	CONFERENCE	GLB	GLU-LAM BEAM	NR	NON-RATED	TN	TOE NAIL
CONN	CONNECTION	GR	GRADE	NS	NEAR SIDE(D)	TO	TOP OF
CONST	CONSTRUCTION	GRD	GRID ONLY	NTE	NOT TO EXCEED	TOF	TOP OF FOOTING
CONT	CONTINUOUS	GSA	U.S. GENERAL SERVICES ADMINISTRATION	NTS	NOT TO SCALE	TOS	TOP OF STEEL
CONTR	CONTRACTOR	GYP BD	GYP SUM BOARD	O/A	OVERALL	TOW	TOP OF WALL
CORR	CORRUGATED(ION)	HB	HOSE BIBB	OC	ON CENTER	TRANSV	TRANSVERSE
COORD	COORDINATE	HC	HOLLOW CORE / HANDICAP	OD	OUTSIDE DIAMETER	TU	TUBE STEEL
CSP	CONCRETE SEWER PIPE	HDPE	HIGH DENSITY POLYETHYLENE	OH	OPPOSITE HAND	TS	TILT-UP
CSP	COUNTERTOP	HDR	HEADER	OHG	OVERHEAD DOOR	TYP	TYPICAL
CNTR	CENTER	HDWR	HARDWARE	OPNG	OPENING	U/S	UNDERSIDE
CRK	CHEMICAL RESISTANT COATING	HGR	HANGER	OPP	OPPOSITE	UC	UNDERCOUNTER
CSK	COUNTERSINK	HMK	HOLLOW METAL KNOCKDOWN	O/S	OUTSIDE	UL	UNDERWRITERS LABORATORIES
CTOP	CONCRETE SEWER PIPE	HMR	HOLLOW METAL WELDED	OSF/O/FACE	OUTSIDE FACE	UNO	UNLESS NOTED OTHERWISE
CW	CONCRETE WALL	HORIZ	HORIZONTAL	OSSC	OREGON STRUCTURAL SPECIALTY CODE	USG	UNITED STATES GYPSUM
		HR(S)	HOUR(S)	OTS	OPEN TO STRUCTURE	U/S	UNDERSIDE
d	PENNY (NAILS)	HS	HEADED STUD	PB	PARTICLE BOARD	VERT	VERTICAL
DBA	DEFORMED BAR ANCHOR	HSB	HIGH STRENGTH BOLT	PDA	POWDER DRIVEN ANCHORS	VEST	VESTIBULE
DBL	DOUBLE	HTG	HEATING	PJ	PANEL JOINT	VET	VINYL ENHANCED TILE
DET/DTL	DETAIL	HVAC	HEATING, VENTILATION AND AIR CONDITIONING	PL	PLATE	W/	WITH
DF	DRINKING FOUNTAIN / DOUGLAS FIR	HWS	HEADED WELD STUD	PLB	PARALLAM BEAM	W/CRC	COATING W/CHEMICAL RESISTANCE
DIA	DIAMETER	IBC	INTERNATIONAL BUILDING CODE	PLMB	PLUMBING	W/O	WITHOUT
DIAPH	DIAPHRAGM	IFC	INTERNATIONAL FIRE CODE	PLYWD	PLYWOOD	WB	WOOD BASE
DIM	DIMENSION	IMC	INTERNATIONAL MECHANICAL CODE	PNL	PANEL	WC	WATER CLOSET / WALL COVERING
DL	DEAD LOAD	IPC	INTERNATIONAL PLUMBING CODE	PR	PAIR	WD	WOOD
DN	DOWN	ID	INSIDE DIMENSION	PS	POUR STRIP	WF	WIDE FLANGE BEAM
DP	DEEP	IE	INVERT ELEVATION	PSF	POUNDS PER SQUARE FEET	WH	WATER HEATER
DR	DOOR	IF	INSIDE FACE	PSI	POUNDS PER SQUARE INCH	WP	WATER PROOF / WOOD PANELING
DS	DOWNSPOUT	IFS	EXTERIOR INSULATION FINISH SYSTEM	PT	PRESSURE TREATED / PORCELAIN TILE	WR	WATER RESISTANT
DWG	DRAWING			PVC	POLYVINYL CHLORIDE	WS	WATER STOP / WELDED STUD
DWLS	DOWELS			PVMT	PAVEMENT	WWF	WELDED WIRE FABRIC
						WWR	WELDED WIRE MESH

PROJECT TEAM

OWNER

LAM RESEARCH CORP.
11155 SW LEVENTON DRIVE, BUILDING A
TUALATIN, OREGON 97062
CONTACT: MIKE HALVORSON

PHONE: (503) 685-8345
FAX: (503) 685-8399
EMAIL: Michael.Halvorson@lamresearch.com

ARCHITECT/STRUCT ENGINEER

MACKENZIE
1515 SE WATER AVENUE, SUITE 100
PORTLAND, OREGON 97214
CONTACT: PETER ALTO

PHONE: (503) 224-9560
FAX: (503) 228-1285
palto@grpmack.com

CIVIL

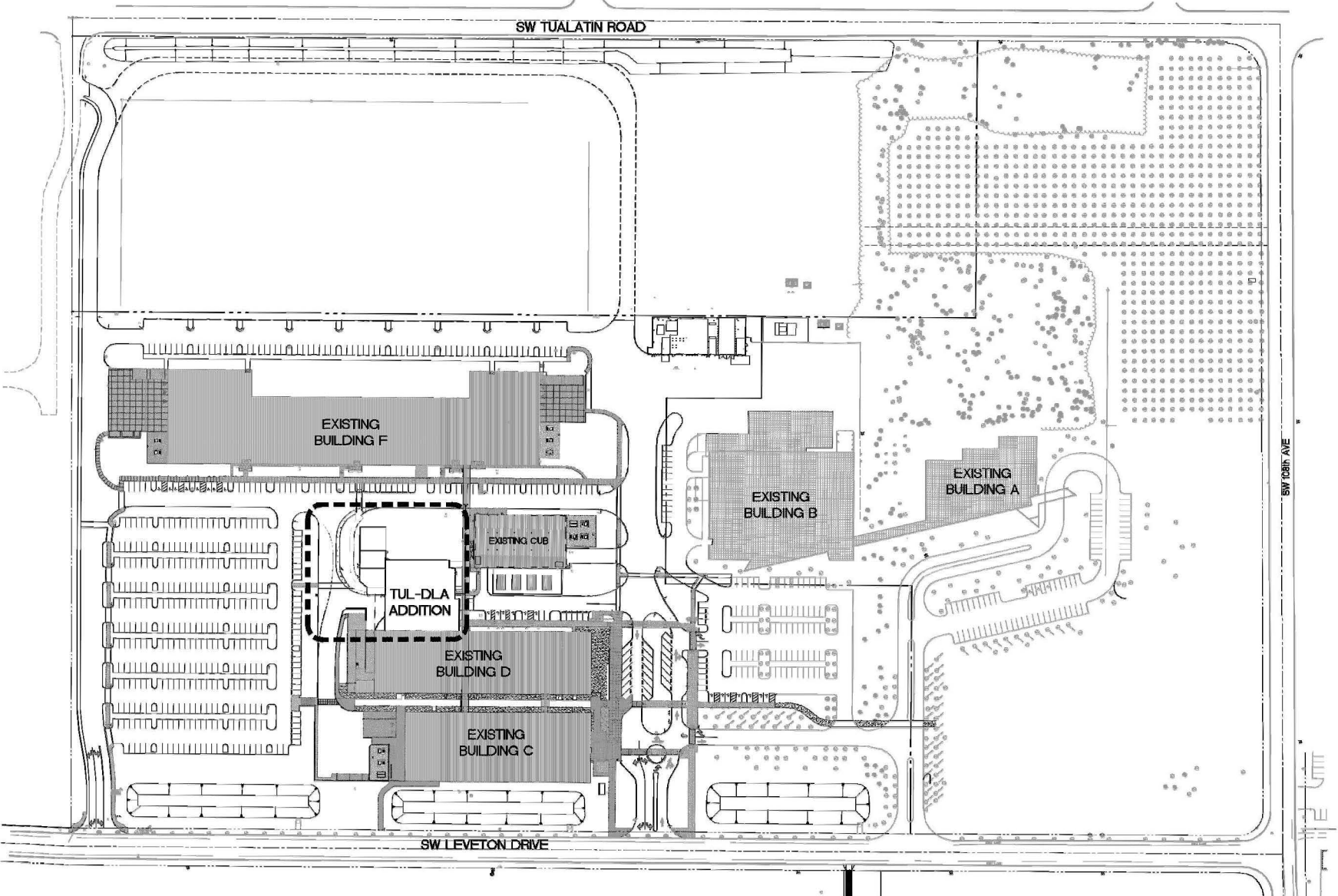
MACKENZIE
1515 SE WATER AVENUE, SUITE 100
PORTLAND, OREGON 97214
CONTACT: MATT BUTTS

PHONE: (503) 224-9560
FAX: (503) 228-1285
EMAIL: mbutts@mcknze.com

LANDSCAPE

MACKENZIE
1515 SE WATER AVENUE, SUITE 100
PORTLAND, OREGON 97214
CONTACT: RON HEIDEN

PHONE: (503) 224-9560
FAX: (503) 228-1285
EMAIL: rheidn@mcknze.com



OVERALL SITE PLAN



SHEET LIST

T1.0 TITLE SHEET AND CODE ANALYSIS

- C1.0 EXISTING CONDITIONS PLAN
- C2.0 DEMO PLAN
- C2.1 SITE PLAN
- C2.2 GRADING PLAN
- C2.3 UTILITY PLAN
- C2.4 EROSION CONTROL PLAN
- IL1.0 PHOTOMETRIC ANALYSIS
- IL2.0 PHOTOMETRIC CUT-SHEETS

LANDSCAPE
L2.1 LANDSCAPE PLAN

ARCHITECTURAL
A3.1 ELEVATIONS

REVISIONS:

NO.	REVISIONS	REVISION DELTA
1	THIS SHEET	CLOSING DATE

SHEET TITLE:

TITLE SHEET/
PROJECT
INFORMATION

DRAWN BY: ELJ

CHECKED BY: PPA

SHEET:

T1.0



SANITARY SEWER INFORMATION

- SS1** MANHOLE
RIM = 172.75'
8" IN (W)
8" OUT (E)
FLOWLINE I.E. = 157.1'
- SS2** MANHOLE
RIM = 162.38'
4" IN (NE)
8" IN (W)
12" IN (S)
15" OUT (E)
FLOWLINE I.E. = 153.5'
- SS3** MANHOLE
RIM = 145.14'
8" IN (NE)
8" OUT (S)
FLOWLINE I.E. = 140.6'

	RIM = 164.62' OUT (S)				OUT (W)
(SD7)	LYNCH STYLE CATCH BASIN RIM = 160.66' OUT (S)	(SD18)	LYNCH STYLE CATCH BASIN RIM = 167.21' OUT (W)		
(SD8)	LYNCH STYLE CATCH BASIN RIM = 160.76' OUT (S)	(SD19)	LYNCH STYLE CATCH BASIN RIM = 166.70' OUT (W)		
(SD9)	SLOT DRAIN RIM (NW) = 160.56' RIM (SE) = 160.80' 6" I.E. OUT (E) = 159.6'	(SD20)	LYNCH STYLE CATCH BASIN RIM = 163.18' OUT (W)		
(SD10)	LYNCH STYLE CATCH BASIN RIM = 154.57' OUT (E)	(SD21)	LYNCH STYLE CATCH BASIN RIM = 169.09' OUT (S)		

- 1) THE FIELD SURVEY FOR THIS MAP WAS COMPLETED ON JULY 8, 2015.
- 2) ELEVATIONS AND CONTOURS SHOWN ON THIS MAP ARE BASED ON WASHINGTON COUNTY BENCH MARK NUMBER 905. BEING A BRASS DISK STAMPEL "WASHINGTON COUNT BM 1987". THE BRASS DISK IS LOCATED APPROXIMATELY 270 FEET WEST OF THE CENTERLINE OF 118TH AVENUE AND 34 FEET NORTH OF THE CENTERLINE OF HERMAN ROAD. THE DISK HAS AN ELEVATION OF 136.17' ON THE NVD 1929 DATUM.
- 3) THE SURVEYOR WAS NOT PROVIDED WITH A TITLE REPORT FOR THE PROPERTY, AND IT IS UNKNOWN IF ANY EASEMENTS ENCOMBER OR BENEFIT THE PROPERTY.
- 4) THE UNDERGROUND UTILITIES ARE BASED ON THE MARKINGS PER A PRIVATE UTILITY LOCATING COMPANY. THE STORM SEWER LINES ARE BASED ON ABOVE GROUND EVIDENCE AND AS-BUILT DRAWINGS AND THEIR LOCATIONS DEPICTED ARE APPROXIMATE.

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER ABOVE OR BELOW GROUND. THE SURVEYOR FURTHER WARRANTS THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION AND DEPTH INDICATED ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



NORTHWEST
1815 NW 169th PLACE, SUITE 2090
BEAVERTON, OR 97006
PH: (503) 848-2127 FAX: (503) 848-2179
EMAIL: nwsurveying@nwsvy.com

URVEYING, INC.

A PORTION OF PARCEL 1 OF PARTITION PLAT NO. 2001-058,
LOCATED IN THE NORTHEAST 1/4 OF SECTION 22,
TOWNSHIP 3 SOUTH, RANGE 1 WEST, W.M.,
CITY OF TUALATIN, WASHINGTON COUNTY, OREGON



MACKENZIE
DESIGN DRIVEN • CLIENT FOCUSED

Client



Lam
RESEARCH

TOPOGRAPHIC SURVEY

OREGON
TAX MAP 25-1-224B

TUALATIN,
TAX LOT 100

PROJECT:
DLA TUALATIN
BUILDING D
ADDITION

**1857 SW LEVETON DR
TUALATIN, OR 97062**

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DRAWING NO.: 1344 TOPO

SCALE: AS NOTED

DRAWING GENERATED BY: L02004

DRAWN BY: CDW

CHECKED BY: SFF

PREPARED FOR:
LAM RESEARCH CORPORATION
4650 CUSHING PARKWAY
FREMONT, CA 94538

REVISIONS:

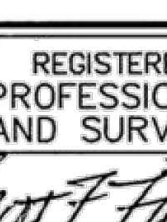
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REVISIONS:

INITIAL RELEASE: JULY 21, 2015

SHEET TITLE:
**EXISTING
CONDITIONS
PLAN**

REGISTERED
PROFESSIONAL
LAND SURVEYOR



OREGON
JUNE 30, 1997
SCOTT F. FIELD
2844

12-31-2015
RENEWAL DATE

DRAWN BY: NKL

CHECKED BY: BDN

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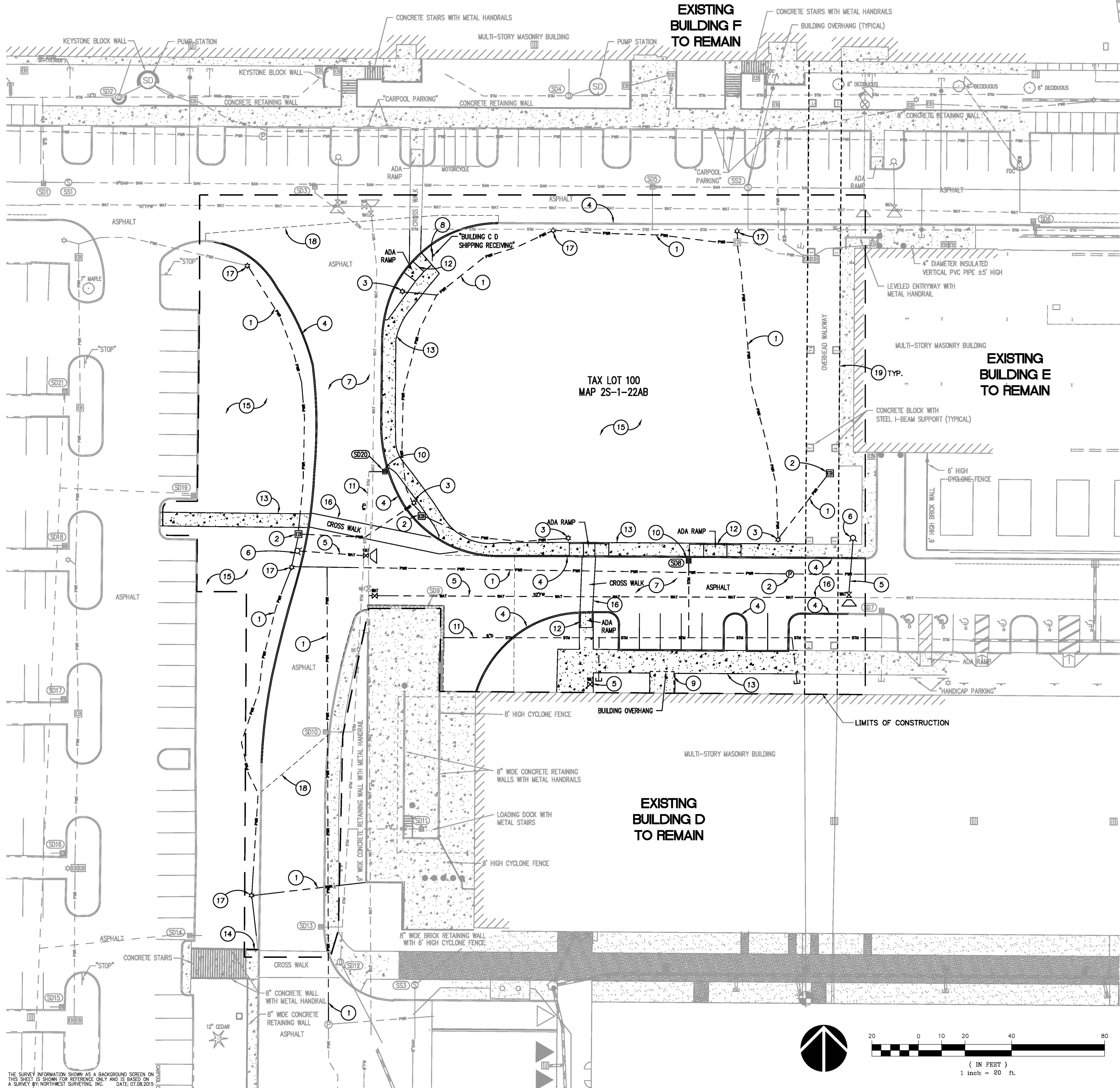
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VIEW - 12/18/15

JOB NO. 2150163.00



DEMOLITION NOTES

1. DEMOLITION GENERALLY INCLUDES PROPER REMOVAL OF ALL EXISTING IMPROVEMENTS FROM THE SITE, INCLUDING ABOVE AND BELOW GROUND VEGETATION, UTILITIES AND STRUCTURES. KEYNOTES ARE PROVIDED WHERE SPECIFIC REQUIREMENTS MAY BE WARRANTED.
2. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ALL UTILITIES ARE PROPERLY TURNED OFF PRIOR TO ANY SITE OR BUILDING DEMOLITION.
3. ALL HAZARDOUS MATERIALS (IF ANY ARE FOUND TO EXIST) SHALL BE DISPOSED IN ACCORDANCE WITH DEQ REQUIREMENTS.
4. INSTALL APPROPRIATE EROSION CONTROL MEASURES AND SECURITY FENCES PRIOR TO DEMOLITION.
5. COORDINATE DEMOLITION WORK WITH THE PROPOSED SITE DEVELOPMENT PLANS.
6. ALL EXCAVATIONS SHALL BE BACKFILLED WITH MATERIALS, AND COMPACTED, AS SPECIFIED IN THE GEOTECHNICAL REPORT AND PROJECT SPECIFICATIONS.
7. DO NOT STOCKPILE DEMOLISHED MATERIALS, OR SOILS, ON-SITE FOR EXTENDED PERIODS OF TIME.
8. CONTRACTOR SHALL COORDINATE UTILITY DEMOLITION WITH LAM RESEARCH PRIOR TO REMOVAL OR DISCONNECTION

KEYNOTES

1. REMOVE UNDERGROUND POWER
2. REMOVE ELECTRIC BOX/VAULT
3. REMOVE LUMINAIRE AND POLE
4. REMOVE CURB
5. REMOVE WATERLINE & CORRESPONDING THRUST BLOCKS & VALVES
6. REMOVE FIRE HYDRANT, TO BE RELOCATED
7. REMOVE ASPHALT PAVEMENT
8. REMOVE AND SALVAGE EXISTING SIGN, TO BE RELOCATED
9. REMOVE BUILDING CANOPY, SEE ARCH
10. REMOVE CATCH BASIN
11. REMOVE STORM DRAIN LINE
12. REMOVE CURB RAMP
13. REMOVE CONCRETE SIDEWALK
14. REMOVE PORTION OF RETAINING WALL BEYOND BOTTOM STAIR RISER
15. CLEAR EXISTING LANDSCAPE AREA
16. CAP WATERLINE
17. REMOVE AND SALVAGE LIGHT POLE AND LUMINARIE, TO BE RELOCATED.
18. SAWCUT EX. AC PAVING
19. PROTECT EXISTING WALKWAY AND UTILITY BRIDGE TO REMAIN

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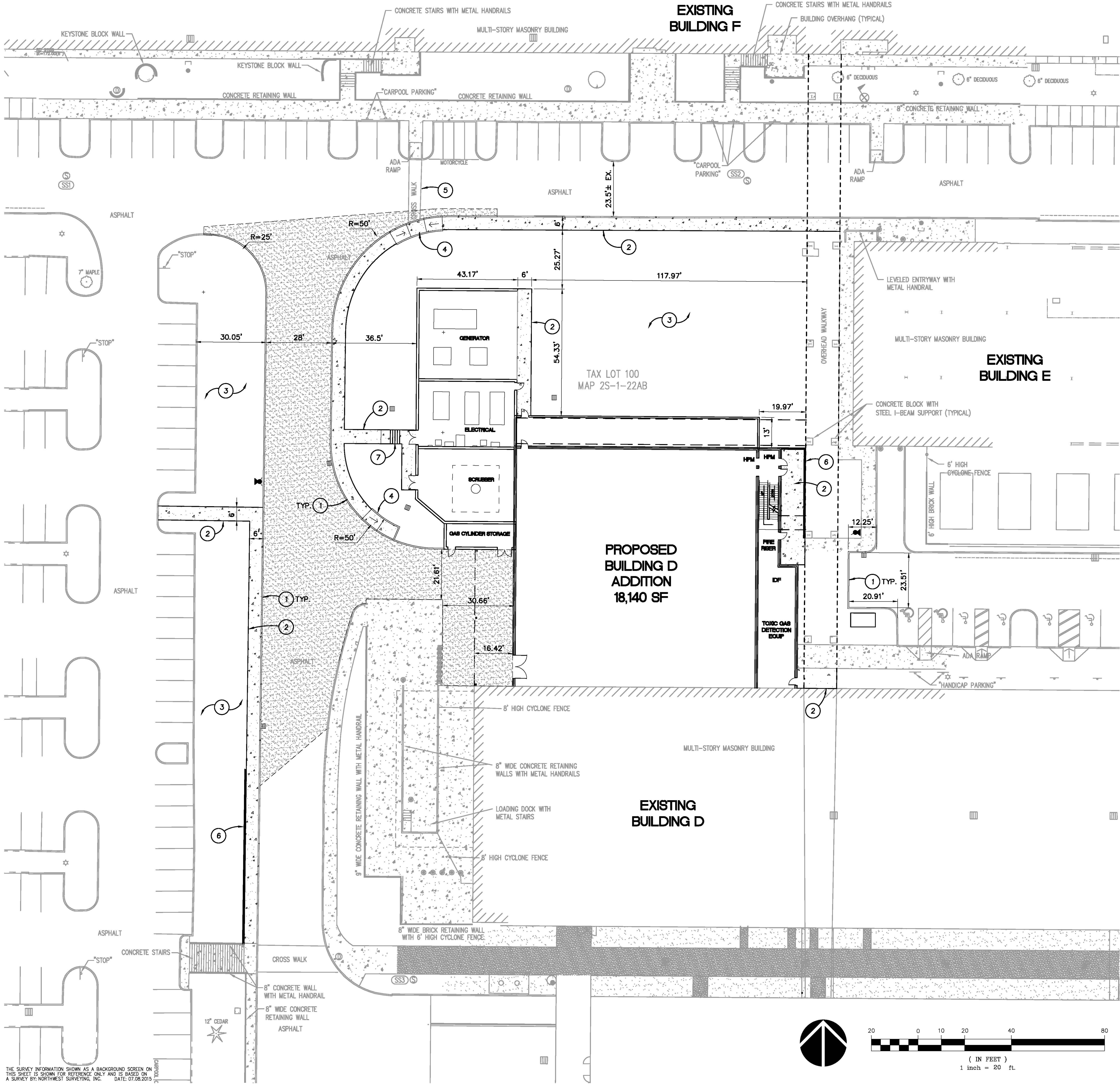
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DEMO PLAN

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LEGEND

- AC PAVING
- CONCRETE SIDEWALK
- VERTICAL CURB
- SAWCUT
- PROPOSED LIGHTPOLE
- EXISTING LIGHTPOLE
- RETAINING WALL

GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND THE REQUIREMENTS OF THE CITY OF TUALATIN, CLEAN WATER SERVICES (CWS), AND THE CURRENT AMERICAN PUBLIC WORKS ASSOCIATION STANDARDS FOR PUBLIC WORKS CONSTRUCTION.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF THERE ARE ANY DISCREPANCIES.
- EFFECTIVE EROSION PREVENTION AND SEDIMENT CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED TO MEET CWS REQUIREMENTS. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
- EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE ROUTED SO THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
- CONTRACTOR SHALL ADJUST ALL STRUCTURES IMPACTED BY CONSTRUCTION IMPROVEMENTS TO NEW FINISH GRADES.
- EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 757.541 THROUGH 757.571; EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS SEVENTY-TWO (72) HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. (ONE CALL LOCATE UTILITY NOTIFICATION CENTER - PORTLAND METRO AREA 246-6699, OREGON 696-4848, ALL OTHER AREAS 1-800-332-2344).
- WHERE CONNECTING TO AN EXISTING PIPE, AND PRIOR TO ORDERING MATERIALS, THE CONTRACTOR SHALL EXPOSE THE END OF THE EXISTING PIPE VERIFY THE LOCATION, SIZE, AND ELEVATION. NOTIFY ENGINEER OF ANY DISCREPANCIES.
- REQUEST BY THE CONTRACTOR FOR CHANGES TO THE PLANS MUST BE APPROVED BY THE ENGINEER.
- PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES

KEYNOTES:

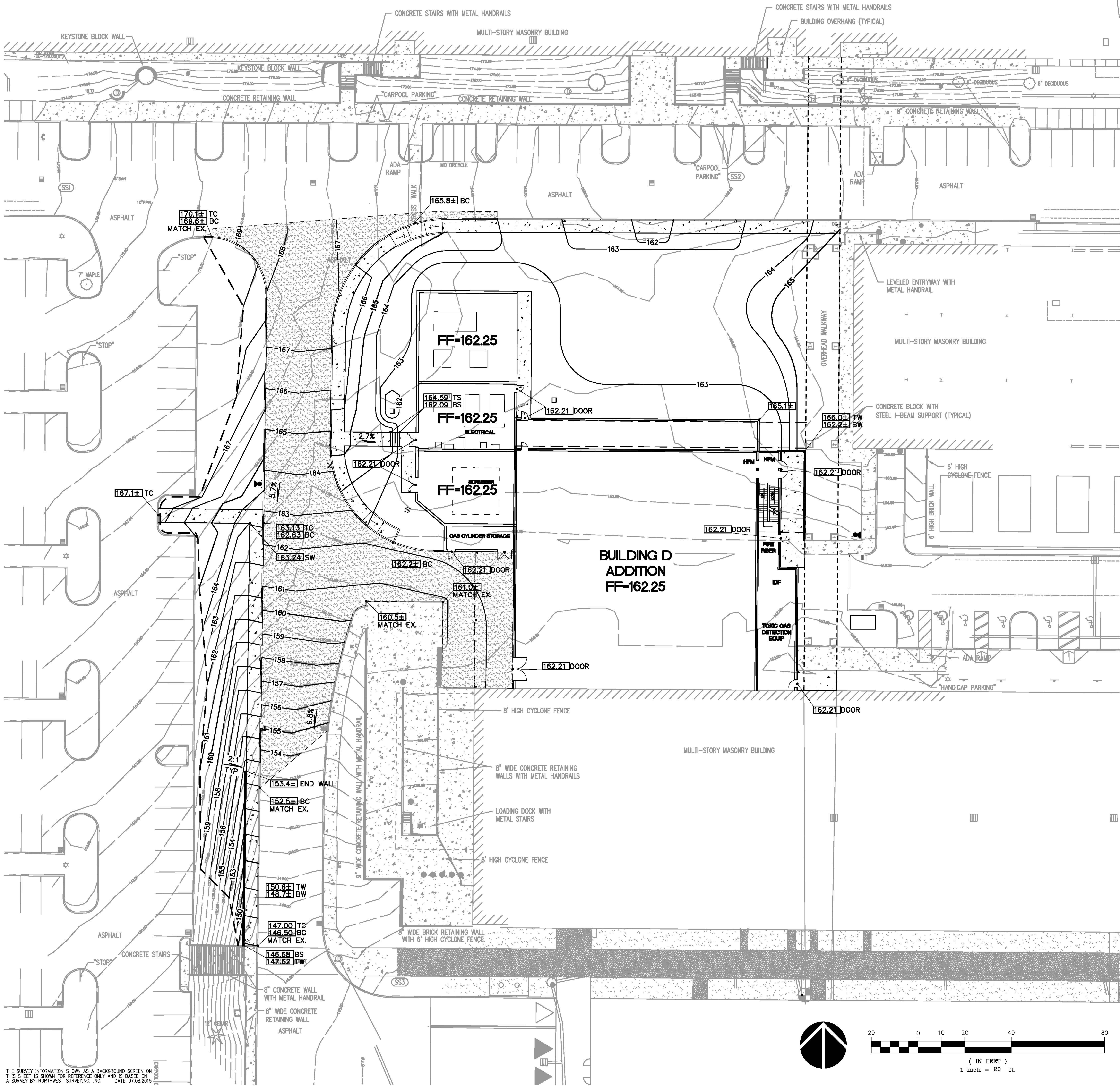
- CONCRETE VERTICAL CURB
- CONCRETE SIDEWALK
- LANDSCAPE AREA, SEE LANDSCAPE PLANS
- CURB RAMP
- REPAIR EXISTING ACCESSIBLE CROSS WALK STRIPING
- C.I.P. CONCRETE RETAINING WALL, MAX HEIGHT 2'
- CONCRETE STAIRS WITH HANDRAIL

SITE COVERAGE SUMMARY:

PAVING AND SIDEWALK	17,245 SF
BUILDING	18,140 SF
LANDSCAPE	17,600 SF
TOTAL AFFECTED AREA	52,985 SF

REVISIONS:

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LEGEND

- 31.0 SURFACE ELEVATION SPOT GRADE
- 105 SURFACE ELEVATION CONTOUR
- SWALE
- SAWCUT
- SLOPE ARROW

GRADING NOTES

- ROUGH GRADING: BRING ALL FINISH GRADES TO APPROXIMATE LEVELS INDICATED. WHERE GRADES ARE NOT OTHERWISE INDICATED, FINISH GRADES ARE TO BE THE SAME AS ADJACENT SIDEWALKS, CURBS, OR THE OBVIOUS GRADE OF ADJACENT STRUCTURE. GRADE TO UNIFORM LEVELS OR SLOPES BETWEEN POINTS WHERE GRADES ARE GIVEN. ROUND OFF SURFACES, AVOID ABRUPT CHANGES IN LEVELS. ROUGH GRADE TO ALLOW FOR DEPTH OF CONCRETE SLABS, WALKS, AND THEIR BASE COURSES. GRADE FOR PAVED DRIVES AND PAVED PARKING AREAS AS INDICATED AND SPECIFIED HEREIN, AND PROVIDE FOR SURFACE DRAINAGE AS SHOWN, ALLOWING FOR THICKNESS OF SURFACING MATERIAL.
- FINISH GRADING: AT COMPLETION OF JOB AND AFTER BACKFILLING BY OTHER CRAFTS HAS BEEN COMPLETED, REFILL AND COMPACT AREAS WHICH HAVE SETTLED OR ERODED TO BRING TO FINAL GRADES.
- EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 757.541 THROUGH 757.571; EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS 72 HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
- EFFECTIVE EROSION PREVENTION AND SEDIMENT CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED MEETING CWS REQUIREMENTS. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
- EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE SO ROUTED THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
- SITE TOPSOIL SHALL BE STOCKPILED DURING CONSTRUCTION AND USED FOR LANDSCAPING.
- THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS BASED ON A SURVEY BY NORTHWEST SURVEYING, AND IS SHOWN FOR REFERENCE ONLY. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS WITH HIS OWN RESOURCES PRIOR TO START OF ANY CONSTRUCTION.
- CONTRACTOR TO COORDINATE GRADES AT ENTRANCE WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
- 5% MAX SLOPE (EXCLUDING RAMPS) AT PEDESTRIAN SIDEWALK CONNECTIONS BETWEEN PUBLIC R.O.W. AND BUILDING ENTRANCES.
- WHERE SLOPES ARE STEEPER THAN 3:1, CONTRACTOR SHALL INSTALL JUTE MATTING. SLOPE SHALL BE PREPARED TO ENSURE COMPLETE AND DIRECT CONTACT OF MATTING WITH SOIL. FOLLOW MANUFACTURER'S RECOMMENDATIONS.
- ALL SPOT ELEVATIONS SHOWN ARE PAVEMENT GRADE UNLESS NOTED OTHERWISE ON PLANS.
- GRADE ALL AREAS TO ENSURE POSITIVE DRAINAGE. NOTIFY ENGINEER IF ANY CONFLICTS.
- PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES.

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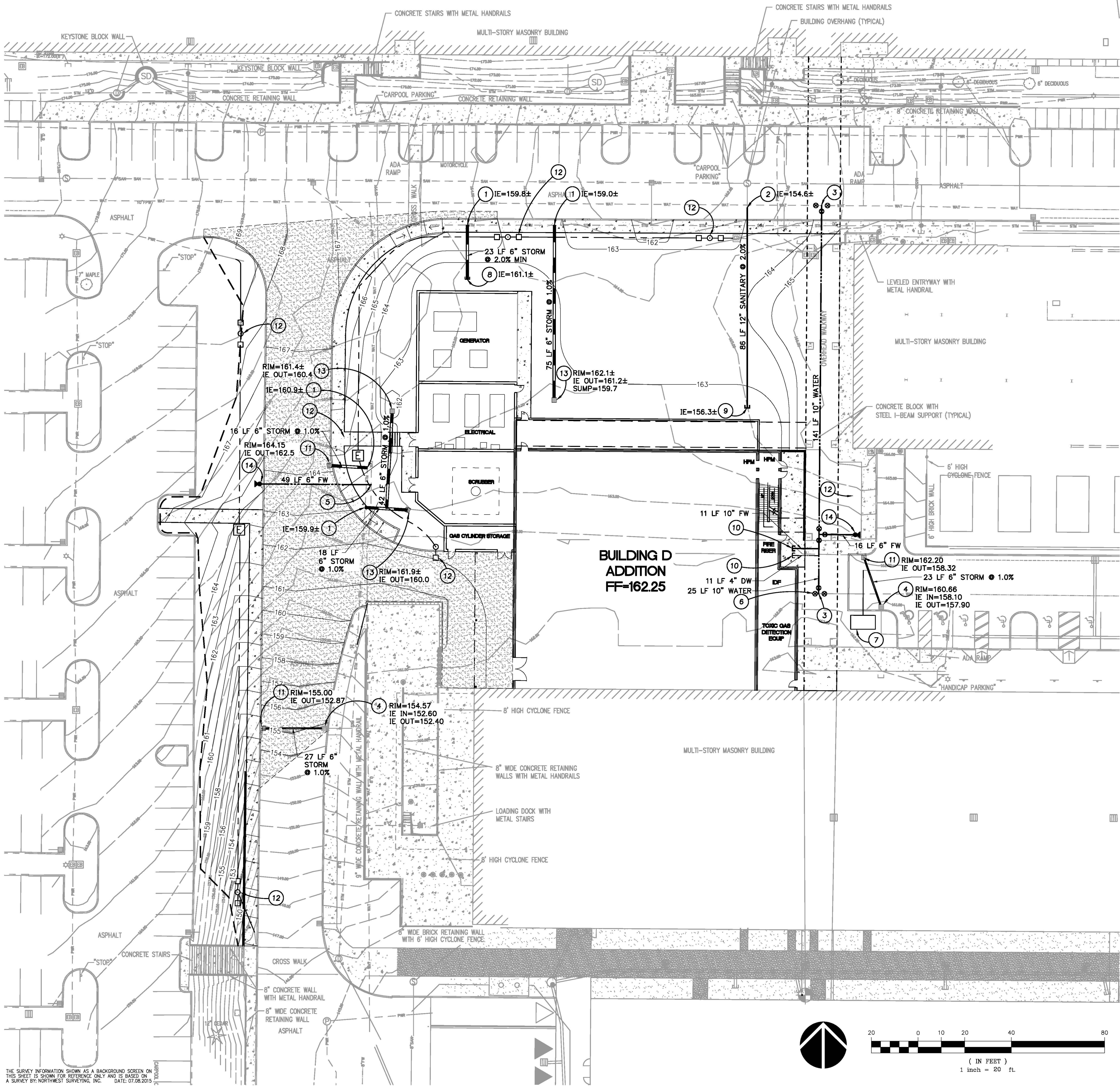
SHEET TITLE:
GRADING PLAN

DRAWN BY: NKL
 CHECKED BY: BDN
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JOB NO. **2150163.00**

DESIGN REVIEW - 12/18/15



LEGEND

- STORM LINE
- FIRE WATER LINE
- SWALE
- CATCH BASIN
- THRUST BLOCK
- FIRE HYDRANT ASSEMBLY
- WATER VALVE
- LIGHT POLE

UTILITY NOTES

- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF CITY OF TUALATIN, CLEAN WATER SERVICES, AND THE CURRENT EDITION OF THE UNIFORM PLUMBING CODE AND THE INTERNATIONAL BUILDING CODE. ALL WORK WITHIN THE PUBLIC R.O.W. REQUIRES A PUBLIC WORKS PERMIT.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF THERE ARE ANY DISCREPANCIES.
- PROVIDE CLEANOUTS AS REQUIRED IN THE CURRENT UNIFORM PLUMBING CODE CHAPTER 7, SECTIONS 707 AND 719, AND CHAPTER 11, SECTION 1101.12. NOTE: NOT ALL REQUIRED CLEANOUTS ARE SHOWN ON THE PLANS.
- ALL STORM PIPING IS SIZED FOR A MANNING'S "N" VALUE = 0.013. ALL STORM PIPING IS DESIGNED USING CONCENTRIC PIPE TO PIPE AND WYE FITTINGS, UNLESS OTHERWISE NOTED.
- SEE MECHANICAL DRAWINGS FOR UTILITIES LOCATED WITHIN THE BUILDING AND TO 5' OUTSIDE THE BUILDING.
- ALL DOWNSPOUT LEADERS TO BE 6" AT 2.0% MIN. UNLESS NOTED OTHERWISE.
- VERIFY LOCATION, SIZE AND DEPTH OF EXISTING UTILITIES BY POTHOLING PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF DISCREPANCIES.
- THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS BASED ON A SURVEY PREPARED BY NORTHWEST SURVEYING, DATED JULY 21, 2015.
- CONTRACTOR TO PROVIDE POWER TO IRRIGATION CONTROLLER. SEE SPECIFICATIONS AND LANDSCAPE PLANS.
- SEE BUILDING PLUMBING DRAWINGS FOR PIPING WITHIN THE BUILDING AND UP TO 5' OUTSIDE THE BUILDING, INCLUDING ANY FOUNDATION DRAINAGE PIPING.
- CONTRACTOR TO MAINTAIN MINIMUM 3 FT OF COVER OVER ALL WATER LINE.
- PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES.

KEYNOTES:

- CONNECT PROPOSED STORM LATERAL TO EXISTING STORM LINE. CONTRACTOR TO VERIFY LOCATION AND DEPTH PRIOR TO CONSTRUCTION.
- CONNECT PROPOSED SANITARY SEWER SERVICE TO EXISTING 12" SANITARY SEWER STUB. CONTRACTOR TO VERIFY INVERTS PRIOR TO CONSTRUCTION.
- CONNECT PROPOSED FIRE WATER TO EXISTING WATER LINE
- CONNECT PROPOSED STORM WATER LATERAL TO EXISTING STORM WATER CATCH BASIN. CONTRACTOR TO VERIFY EXISTING INVERTS.
- CONNECT PROPOSED FIRE HYDRANT TO EXISTING WATER LINE
- CAP EXISTING WATER LINE AT VALVE
- RELOCATE POWER VAULT, COORDINATE WITH MEP
- CONNECT BUILDING DOWNSPOUT SYSTEM TO SITE STORM DRAIN SYSTEM.
- CONNECT SEWER LATERAL TO BUILDING, SEE PLUMBING PLANS.
- CONNECT FIRELINE & WATER SERVICE TO BUILDING COORDINATE SIZE & LOCATION WITH PLUMBING PLANS.
- CONSTRUCT CATCH BASIN. CONTRACTOR TO VERIFY INVERTS PRIOR TO CONSTRUCTION.
- INSTALL SALVAGED LIGHT POLE AND LUMINARIE, SEE IL1.0
- CONSTRUCT AREA DRAIN
- INSTALL FIRE HYDRANT

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SHEET TITLE:
UTILITY PLAN

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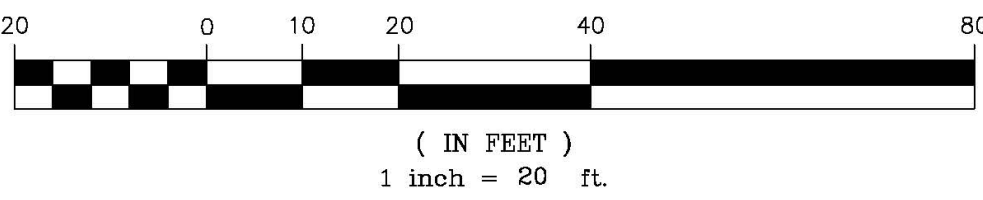
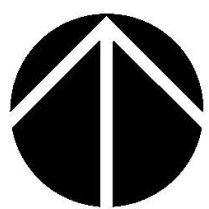
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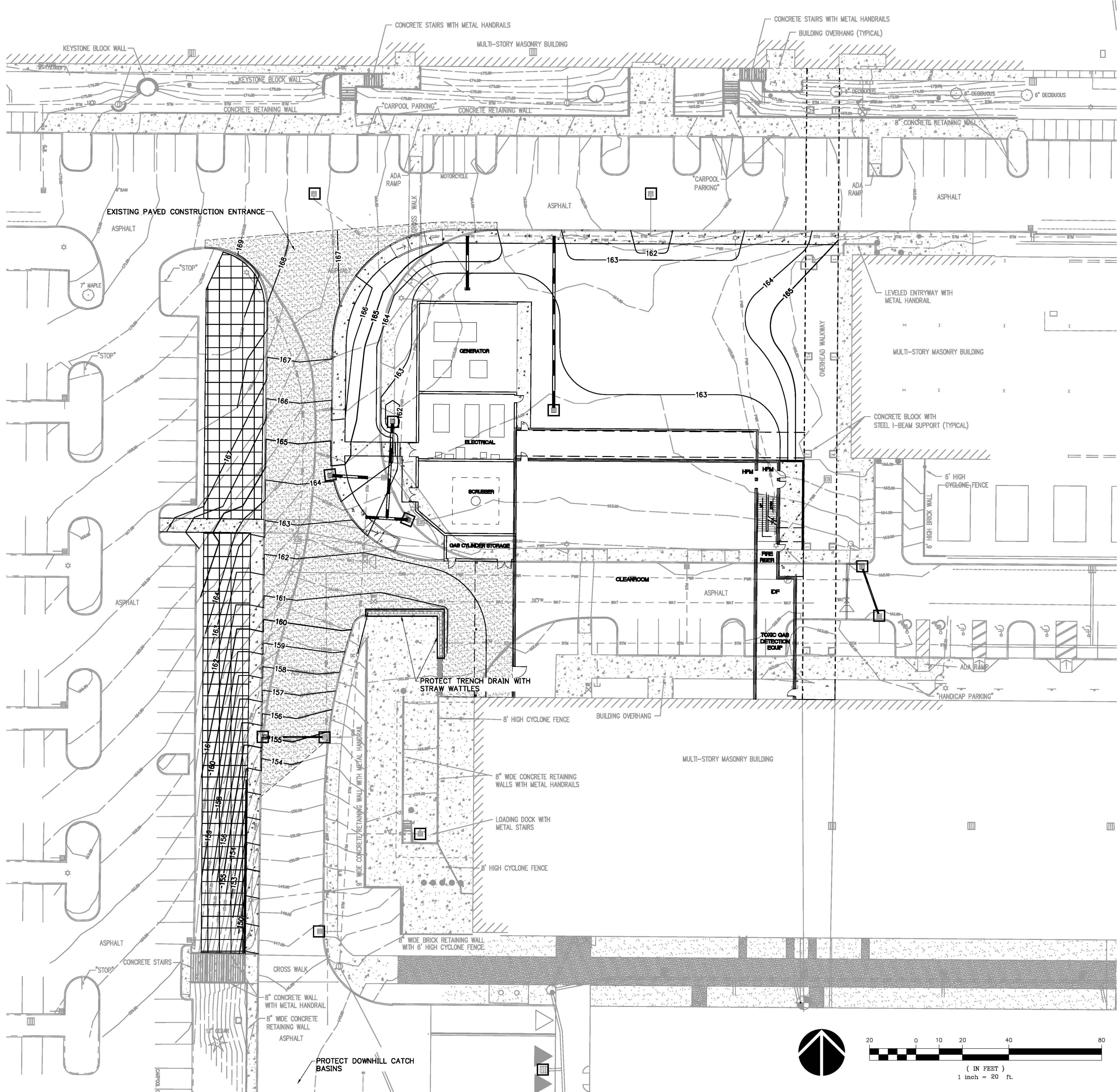
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DESIGN REVIEW - 12/18/15

THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS SHOWN FOR REFERENCE ONLY AND IS BASED ON A SURVEY BY: NORTHWEST SURVEYING, INC. DATE: 07.08.2015





LEGEND

- 105 SURFACE ELEVATION CONTOUR
- INLET PROTECTION
- TEMPORARY SLOPE STABILIZATION UNTIL PERMANENT VEGETATION IS ESTABLISHED

EROSION CONTROL GENERAL NOTES

- TOTAL DISTURBANCE AREA: 52,985 SF (1.22 AC)
- HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
 - EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS.
 - THIS DRAWING IS FOR GENERAL GUIDANCE ONLY. THE CONTRACTOR SHALL MEET ALL CITY OF TUALATIN AND CWS EROSION/SEDIMENT CONTROL REQUIREMENTS. ALL EROSION CONTROL MEASURES SHALL CONFORM TO THE CITY OF TUALATIN AND CWS REQUIREMENTS AND THE PLANS AND SPECIFICATIONS SPECIFIC TO THIS PROJECT.
 - CONSTRUCT EROSION CONTROL IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS. STAGE CONSTRUCTION TO INCLUDE INSTALLATION OF PERIMETER SEDIMENT FENCING AS REQUIRED.
 - METHOD OF INSTALLATION FOR SEDIMENT FENCE SHALL NOT CAUSE DAMAGE TO VEGETATED SLOPE EXCEPT AT POINT OF INSTALLATION. SIDECAST MATERIAL SHALL BE KEPT TO A MINIMUM AND SHALL BE TO THE UPHILL SIDE OF THE SEDIMENT FENCE. THE FENCE SHALL BE INSTALLED AT LEAST 4 FEET FROM ADJACENT TREES. ANY EXPOSED GROUND SHALL BE SEEDED AND COVERED WITH STRAW MULCH TO PREVENT EROSION. TEMPORARY GROUND COVER SHALL BE MAINTAINED UNTIL A HEALTHY STAND OF GRASS HAS BEEN ESTABLISHED. SEEDING SHALL BE WITH NATURAL SPECIES FOR THE AREA. SEE THE SPECIAL SPECIFICATIONS FOR PROPER SEED MIX.
 - ALL EROSION CONTROL DEVICES SHALL BE EXAMINED AND REPAIRED AFTER EACH STORM OCCURRENCE, AND INLETS SHALL BE CLEANED OF SEDIMENT WHENEVER NECESSARY.
 - HYDROSEED AND MULCH ALL DISTURBED AREAS UPON COMPLETION OF CONSTRUCTION OR AS DIRECTED BY THE INSPECTOR.
 - THE CONTRACTOR SHALL LIMIT CONSTRUCTION TRAFFIC TO PAVED AREAS TO PREVENT AND MINIMIZE SEDIMENT TRACKING OFF-SITE. CONTRACTOR SHALL SWEEP OR VACUUM PAVED AREAS IF SEDIMENT ACCUMULATION OCCURS. DO NOT TRACK SEDIMENT TO THE PUBLIC STREET.
 - INSTALL TEMPORARY EROSION PREVENTION SUCH AS JUTE NETTING OR GEOTEXTILE ON DISTURBED AREAS STEEPER THAN 4H:1V.



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EROSION CONTROL
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DRAWN BY: NKL

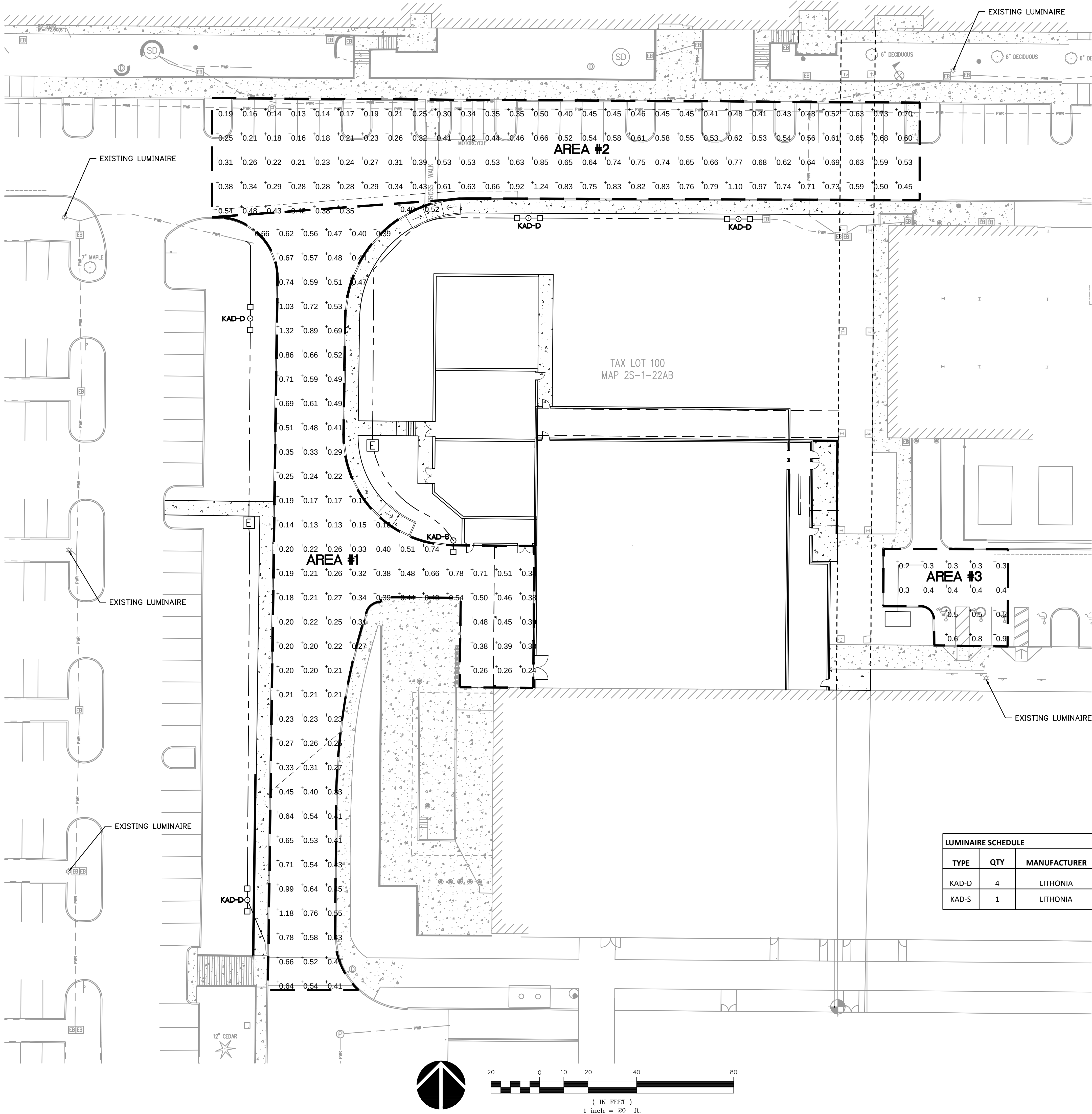
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DESIGN REVIEW - 12/18/15



- LIGHTING NOTES:**
- THIS SHEET IS PROVIDED AS A GENERAL GUIDELINE FOR FINAL DESIGN OF THE LIGHTING SYSTEM. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A FINAL LIGHTING DESIGN AND PLAN CONFORMING TO THE PHOTOMETRICS AND SPECIFICATIONS, INCLUDED ON THIS SHEET, FOR THE ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
 - THE FINAL DESIGN PLAN SHALL INCLUDE ALL LIGHTING DETAILS INCLUDING LUMINAIRES, POLES, BASES, CONDUIT AND WIRING, AND POWER SOURCE.
 - PHOTOMETRICS IN FOOT-CANDLES
 - TO CONVERT FROM FOOT-CANDLES TO LUMENS PER SQUARE METER:
1 FOOT-CANDLE (FC) = 10.76 LUMEN/SQUARE METER (LM/M²)
 - LUMINAIRES ARE POLES MUST HAVE DECORATIVE FINISH (NO UNPAINTED METAL). MATCH EXISTING CAMPUS STANDARD LIGHTS.
 - FIXTURES MUST BE SHIELDED TO PREVENT LIGHT TRESPASS
 - LIGHTING CONDUIT, CONDUCTOR, AND VAULTS SHOWN FOR REFERENCE ONLY. ELECTRICAL DESIGN TO BE COMPLETED BY MEP.
 - ALL PROPOSED LUMINAIRES ARE A MINIMUM OF 200' FROM PROPERTY LINES.

STATISTICS					
DESCRIPTION	AVG.	MAX.	MIN.	MAX./MIN.	AVG./MIN.
City of Tualatin Standard (not to exceed)	0.5	-	0.13	20.0:1	4.0:1
Area #1	0.4 fc	1.3 fc	0.13 fc	10.2:1	3.4:1
Area #2	0.5 fc	1.2 fc	0.13 fc	9.5:1	3.8:1
Area #3*	0.4 fc	0.9 fc	0.20 fc	4.5:1	2.0:1

*PHOTOMETRICS BASED ON EXISTING LUMINAIRE ONLY. EXISTING LUMINAIRE TYPE UNKNOWN, ACTUAL LIGHTING LEVELS MAY VARY

LUMINAIRE SCHEDULE								
TYPE	QTY	MANUFACTURER	CATALOG#	CONFIGURATION	DISTRIBUTION	WATTS	LUMENS	HEIGHT
KAD-D	4	LITHONIA	KAD_LED_20C_530_30K_R4_MVOLT	DOUBLE	R4 (Type IV)	76	3,605	25'-0" AFG
KAD-S	1	LITHONIA	KAD_LED_20C_530_30K_R4_MVOLT	SINGLE	R4 (Type IV)	76	3,605	25'-0" AFG



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**PHOTOMETRIC
ANALYSIS**

DRAWN BY: BTS
CHECKED BY: BDN
SHEET:

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[illegible]

Drilling		Template #5	Top of Pole		Tension Mounting Slipfitter**											
					Tension 0.0		Singla Bolt	2 at 18\"/>								
					2-5/8\"/>											
					2-7/8\"/>											
					4\"/>											

Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 40°C (104°F) to 104°F.

Ambient	Lumen Multiplier
0°C	3.75
10°C	3.01
20°C	2.67
25°C	2.50
30°C	2.25
40°C	1.00
104°F	0.99

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the KAD LED platform in a 25°C ambient, based on 10,000 hours of LED testing (based per IESNA LM-80-08 and projected per IESNA TM-21-15).

To calculate LFL use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor				
	1.0	0.91	0.86	0.76
		KAD LED 40K/100K		
	1.0	0.93	0.88	0.79
		KAD LED 60K/70K		
	1.0	0.98	0.97	0.94

Electrical Load

				Circuit (A)					
Number of Luminaires	Base Current (A)	Start Rate (A)		120	208	240	277	347	480
20	500	35	0.30	0.18	0.16	0.15	-	-	-
	700	46	0.29	0.23	0.20	0.18	0.15	0.12	-
	1000	71	0.61	0.45	0.31	0.27	0.22	0.17	-
30	500	53	0.44	0.26	0.23	0.20	-	-	-
	700	69	0.48	0.34	0.29	0.24	0.21	0.16	-
	1000	108	0.92	0.52	0.46	0.40	0.32	0.24	-
40	500	71	0.60	0.35	0.32	0.28	0.21	0.16	-
	700	94	0.79	0.46	0.44	0.44	0.37	0.29	-
	1000	121	1.18	0.68	0.59	0.52	0.42	0.30	-
60	500	105	0.67	0.50	0.42	0.38	0.29	0.22	-
	700	137	1.15	0.66	0.58	0.51	0.40	0.29	-
	1000	206	1.81	1.04	0.92	0.81	0.61	0.47	-

NOTE: All ratings in this table are for a nominal system operated at 25°C ambient temperature. Current and power specifications in this table do not include branch circuit derating specified in the National Electrical Code. Please observe all applicable electrical codes and ratings.

Photometric Diagrams

To see complete photometric reports or download .IES files for this product, visit Lithonia Lighting's KAD LED homepage.

Illuminance plots for the KAD LED 100K 400K 100K 40K. Distances are in units of mounting height (20').

FEATURES & SPECIFICATIONS

INTENDED USE

The energy savings and long life of the KAD LED line luminaire make it a reliable choice for illuminating streets, walkways, parking lots, and surrounding areas.

CONSTRUCTION

Single-piece, one-piece, aluminum housing with textured glass lens has a 0.2" nominal wall thickness. Die-cast door frame has an impact-resistant, tempered glass lens that is fully gasketed from one piece fullarton.

FINISH

Exterior parts are protected by a zinc-nickel Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mil thickness for a finish that can withstand extreme climate changes without cracking or peeling.

OPTICS

Precision molded refractive acrylic lenses are available in four distributions. Light engines are available in standard 4000K, 5000K or 5000K (70 CRI) configurations.

ELECTRICAL

Light engine consists of high-efficiency LEDs mounted to a metal-core circuit board. Aluminum heat sink, operating against thermal management and heat. Class 1 electronic driver has a power factor >0.97, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily-replaceable surge protection device meets a minimum Category C Low Imp ANS/IEEE C62.41.2.

INSTALLATION

Included universal mounting block and extruded aluminum pin facilitate quick and easy installation using nearly any existing drilling pattern. Stainless steel luminaire to luminaire to the mounting block securing it to poles or walls. The KAD LED can withstand up to a 1.5 G vibration load rating per ANSI C136.3. The KAD LED also utilizes the standard 5-Series (Template R3) for pole drilling.

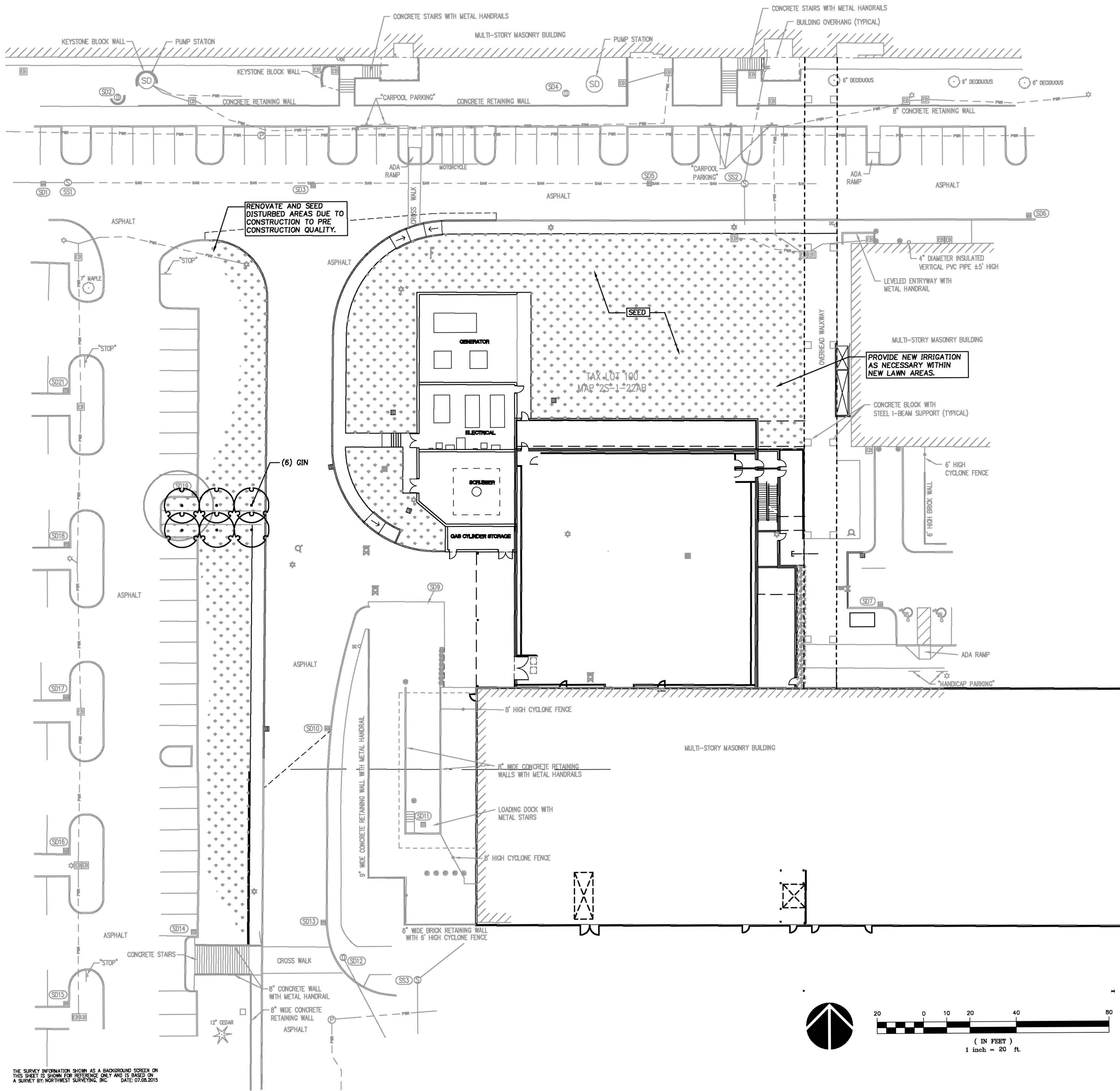
LISTINGS

CSA certified to U.S. and Canadian standards. Luminaire is IP65 rated. Rated for 40°C minimum ambient. DesignLight Consortium's DLC qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlighting.us to confirm which versions are qualified.

WARRANTY

5-year limited warranty. Complete warranty terms located at www.lithonia.com/CustomerService/terms_and_conditions.aspx.
Note: Actual performance may differ as a result of end user environments and application. All values are design or typical value, measured under laboratory conditions at 25°C. Specifications subject to change without notice.

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PLANT SCHEDULE			
TREES/GR. COVER	ABBREVIATION	BOTANICAL NAME / COMMON NAME	CONT
	1-1 1/2"	ROUND RIVER ROCK, 4" DEPTH / LANDSCAPE FABRIC	FLAT
	LL	LAWN SEED	SEED
	GIN	GINKGO BILOBA 'PRINCETON SENTRY'/ PRINCETON SENTRY GINKGO	2" CAL. B&B

- NOTES**
- GENERAL NOTES:**
- CONTRACTOR SHALL CONFIRM ALL EXISTING CONDITIONS PRIOR TO COMMENCING WORK AND NOTIFY THE OWNER OR OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES OR CONFLICTS.
 - CONTRACTOR SHALL VERIFY EXISTING TREES IN THE FIELD PRIOR TO COMMENCEMENT OF WORK.
 - CONTRACTOR SHALL VERIFY INVERT ELEVATIONS OF ALL UNDERGROUND UTILITIES AND NOTIFY LANDSCAPE ARCHITECT IF THERE ARE ANY DISCREPANCIES WITH PLANTING ROOT ZONES. TO LOCATE SITE UTILITIES PRIOR TO PROPOSED EXCAVATION CALL 1-800-332-2344.
 - CONTRACTOR SHALL COORDINATE WITH THE OWNER ANY DISRUPTION TO VEHICULAR CIRCULATION PRIOR TO COMMENCEMENT OF ANY WORK.
 - CONTRACTOR SHALL KEEP PEDESTRIAN TRAVEL WAYS AND ACCESS TO ALL STRUCTURES PROTECTED AT ALL TIMES.
 - CONTRACTOR SHALL REPLACE OR REPAIR DAMAGE TO EXISTING CONCRETE CURB, ASPHALT PAVING, OR OTHER STRUCTURES TO PRE CONSTRUCTION CONDITIONS.
 - ALL LANDSCAPE AREAS SHALL BE INSTALLED AND MAINTAINED AS A MINIMUM TO STANDARDS ACCORDING TO CITY REVISED CODE.
- UNDERGROUND UTILITY NOTES:**
- VERIFY AND LOCATE ALL UNDERGROUND PIPING AND UTILITIES PRIOR TO CONSTRUCTION.
 - DURING THE CONSTRUCTION PROCESS, THE OWNER'S AGENTS SHALL PROVIDE ABOVE AND BELOW GROUND PROTECTION FOR EXISTING TREES AND PLANT MATERIALS TO REMAIN.

- PLANTING NOTES:**
- ALL EXISTING TREES, PLANTS, AND ROOTS IDENTIFIED TO REMAIN SHALL BE PROTECTED FROM DAMAGE DURING ANY CONSTRUCTION PREPARATION, REMOVAL OR INSTALLATION ACTIVITIES WITHIN AND ADJACENT TO PROJECT LIMITS.
 - IF DISTURBANCE IS NECESSARY AROUND EXISTING TREES, CONTRACTOR SHALL PROTECT THE CROWN AND ALL WORK WITHIN THE TREE DRIPZONE SHALL BE LIMITED TO THE USE OF HAND TOOLS AND MANUAL EQUIPMENT ONLY.
 - REPLACE, REPAIR AND RESTORE DISTURBED LANDSCAPE AREAS DUE TO GRADING, TRENCHING OR OTHER REASONS TO PRE CONSTRUCTION CONDITION AND PROVIDE MATERIAL APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.
 - EXISTING AREAS PROPOSED FOR NEW PLANT MATERIAL SHALL BE CLEARED AND LEGALLY DISPOSED UNLESS NOTED OTHERWISE.
 - TOPSOIL SHALL BE AMENDED IN DISTURBED AREAS BY TILLING IN 2\"/>



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Project
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SITE PLAN**

DRAWN BY: KMD

CHECKED BY: RAH

SHEET:

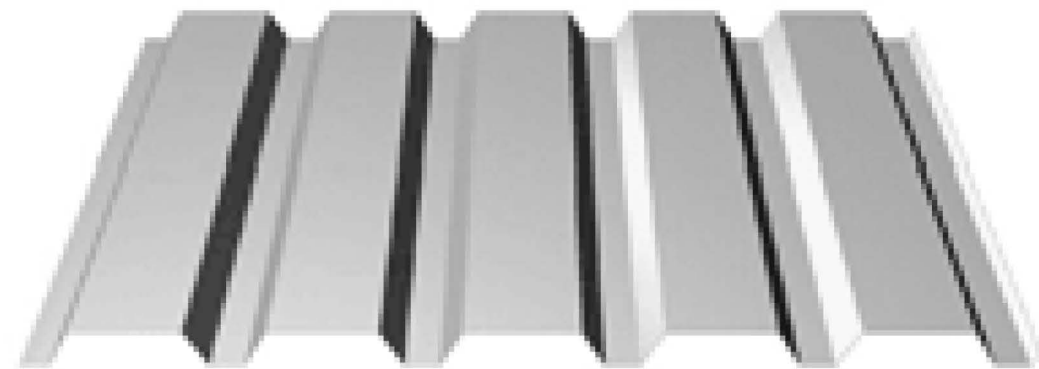
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JOB NO. 2150163.00

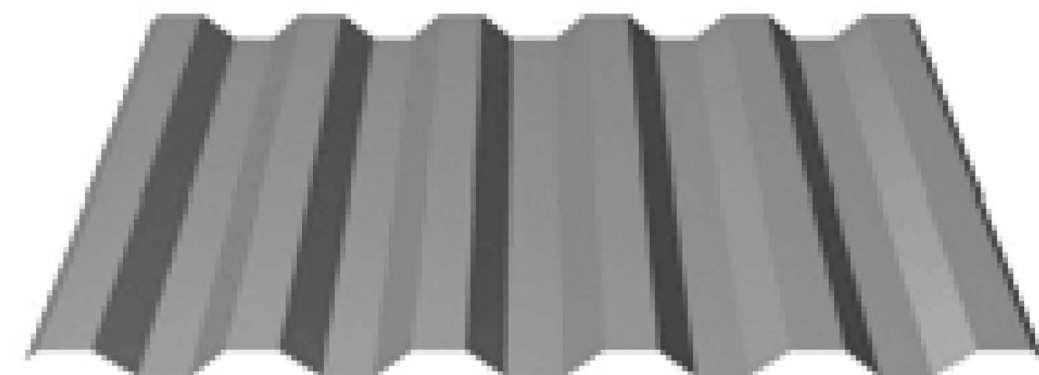
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A SURVEY BY: NORTHWEST SURVEYING, INC. DATE: 07/08/2015

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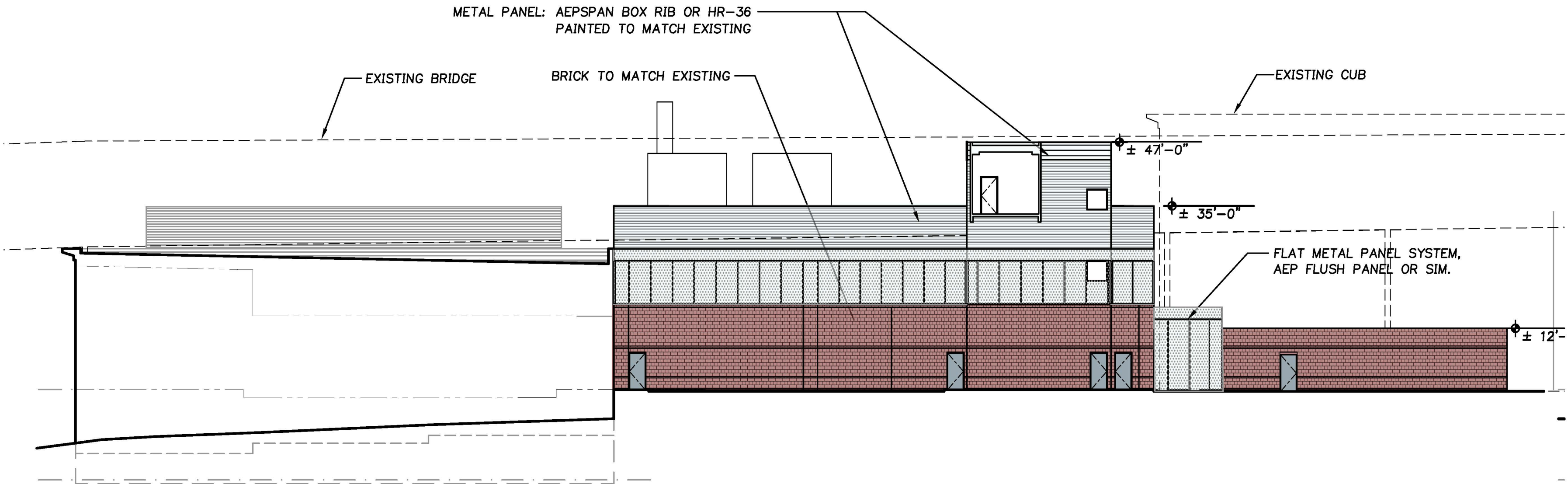
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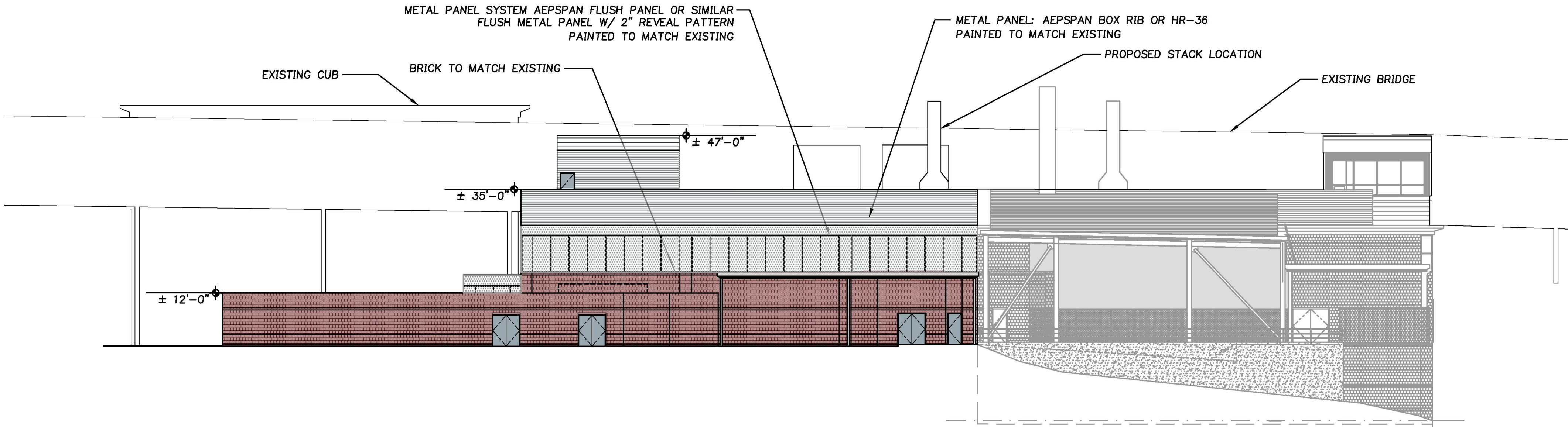
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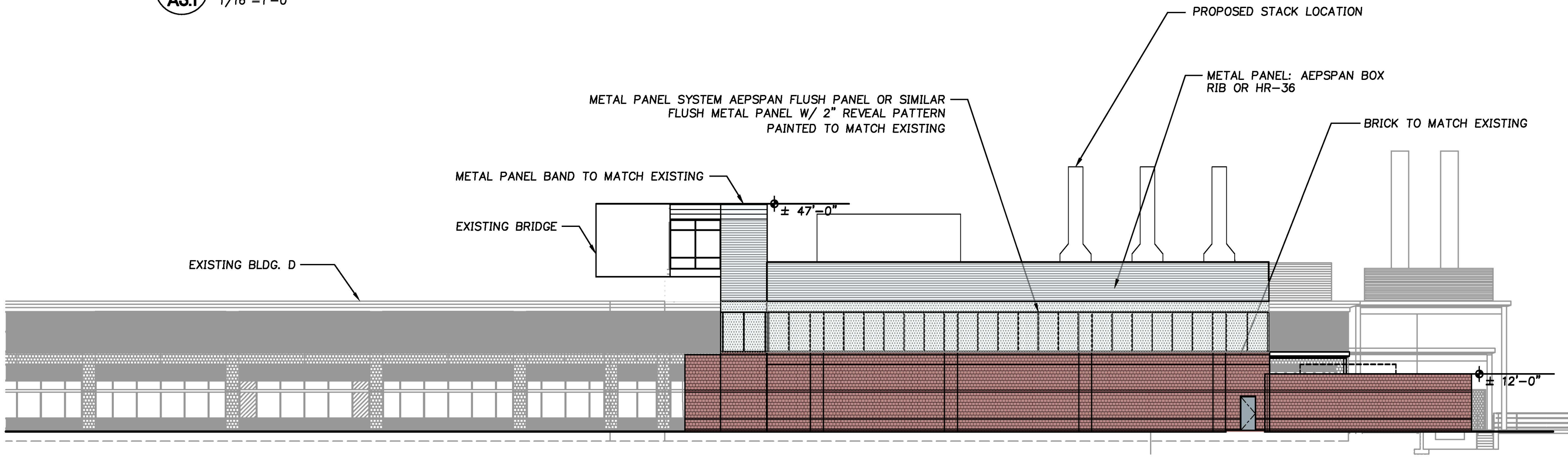
AEPSPAN PRESTIGE PANEL



1 EAST ELEVATION
A3.1 1/16"=1'-0"



2 WEST ELEVATION
A3.1 1/16"=1'-0"



3 NORTH ELEVATION
A3.1 1/16"=1'-0"



10295 SW Ridder Road, Wilsonville, OR 97070
O: 503.570.0626 F: 503.982.9307 republicservices.com

December 16, 2015

Nicole Lammeier, PE (CA), LEED AP
Project Engineer
Mackenzie Design
RiverEast Center
1515 SE Water Ave, Suite 100
Portland OR 97214

Re: Lam Campus Building Addition
Waste & Recycling Enclosure

Dear Nicole;

Thank you, for reaching out to us regarding the additional building being built for LAM, located at: 11155 SW Leveton Drive, Tualatin, OR.

My Company: Republic Services of Clackamas & Washington Counties has the franchise agreement to service this area with the City of Tualatin. We currently provide complete commercial waste removal and recycling services as needed on a weekly basis for this location.

Since we currently have no issues providing service at this location, and this addition will not be affecting the current enclosures, and as you stated that the people within this addition will be utilizing the current enclosures, Republic Services will not be affected by this new building.

Thank you Nicole for your help and concerns for our services prior to this project being developed!

Sincerely,

Frank J. Loneragan
Operations Manager
Republic Services Inc.

Suzannah Stanley

Subject: Pre-App Meeting - LAM Building Addition - 11357 SW Leveton Dr
Location: Library Community Rm

Start: Wed 9/2/2015 3:00 PM
End: Wed 9/2/2015 4:00 PM

Recurrence: (none)

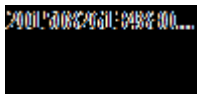
Meeting Status: Accepted

Organizer: Lynette Sanford

When: Wednesday, September 02, 2015 3:00 PM-4:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Library Community Rm

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*



MACKENZIE.

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September 28, 2015

City of Tualatin
Attention: Tony Doran
18880 SW Martinazzi Avenue
Tualatin, OR 97062

Re: **Lam Research R&D Building D Addition**
Trip Generation Letter
Project Number 2150163.00

Dear Mr. Doran:

Mackenzie has prepared this letter to present the anticipated trip generation of the proposed expansion of Building D on the Lam Research campus at 11357 SW Leveton Drive in Tualatin, Oregon, for purposes of determining the need for a Traffic Impact Analysis (TIA) report. For the reasons presented below, we do not believe a TIA would be needed.

PROPOSED EXPANSION

The proposed building is to expand by 26,000 square feet and will support 30 employees. The expansion is proposed to be a two-story cleanroom with a sublevel containing the HVAC and associated machinery supporting the cleanroom. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition*, was used to estimate the trip generation associated with the proposed development. Per the *Trip Generation Manual*, a 26,000 square foot Manufacturing (LUC 140) facility is estimated to generate 19 AM peak hour trips, 19 PM peak hour trips, and 99 average daily trips (ADT).

No other site changes are proposed with the building expansion.

HISTORY

A transportation impact analysis (TIA) was prepared in 2001 by Mackenzie, which addressed a Master Plan with a total of 448,000 square feet of manufacturing and research and development uses. Although trips for the Master Plan were never recognized as "vested" by the City, it should be acknowledged that the proposed expansion is a very small percentage of the master plan development.

The TIA concluded that no intersections would be significantly impacted as a result of the master plan project trips, with the exception of the SW Herman Road/SW 108th Avenue intersection, which was anticipated to operate at LOS F with the project. The intersection has since been signalized as was recommended in the TIA; with signalization, the TIA anticipated operation at a level of service B.



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Portland, Oregon ■ Vancouver, Washington ■ Seattle, Washington

TIA REQUIREMENT

The City of Tualatin does not have any specific trip thresholds for requiring a TIA, but does generally require one address all intersections within a ¼ mile of the site. The intersections within this distance include the following:

- Leveton Drive/SW 118th Avenue
- Leveton Drive/SW 108th Avenue
- Tualatin Road/SW 108th Avenue
- Tualatin Road/SW Teton Avenue
- Herman Road/SW 108th Avenue
- Herman Road/SW Teton Avenue

The two intersections on Herman Road at SW 108th Avenue and Teton Avenue have both been signalized since the 2001 TIA was prepared. All other intersections were anticipated to operate at acceptable levels in the TIA.

With the low number of peak hour trips anticipated with the expansion of Building D, impacts on these intersections will be minimal, and not trigger any offsite mitigation. Therefore, it is not anticipated a full TIA would be needed for the expansion.

If you have any questions regarding this trip generation letter and our recommendation to not require a TIA, please do not hesitate to contact me.

Sincerely,



Brent Ahrend, PE
Senior Associate | Traffic Engineer

Enclosure(s): Plans

c: Janet Jones, Peter Alto, Lee Leighton – Mackenzie



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SHEET TITLE:

**OVERALL
SITE PLAN**

DRAWN BY: ELJ

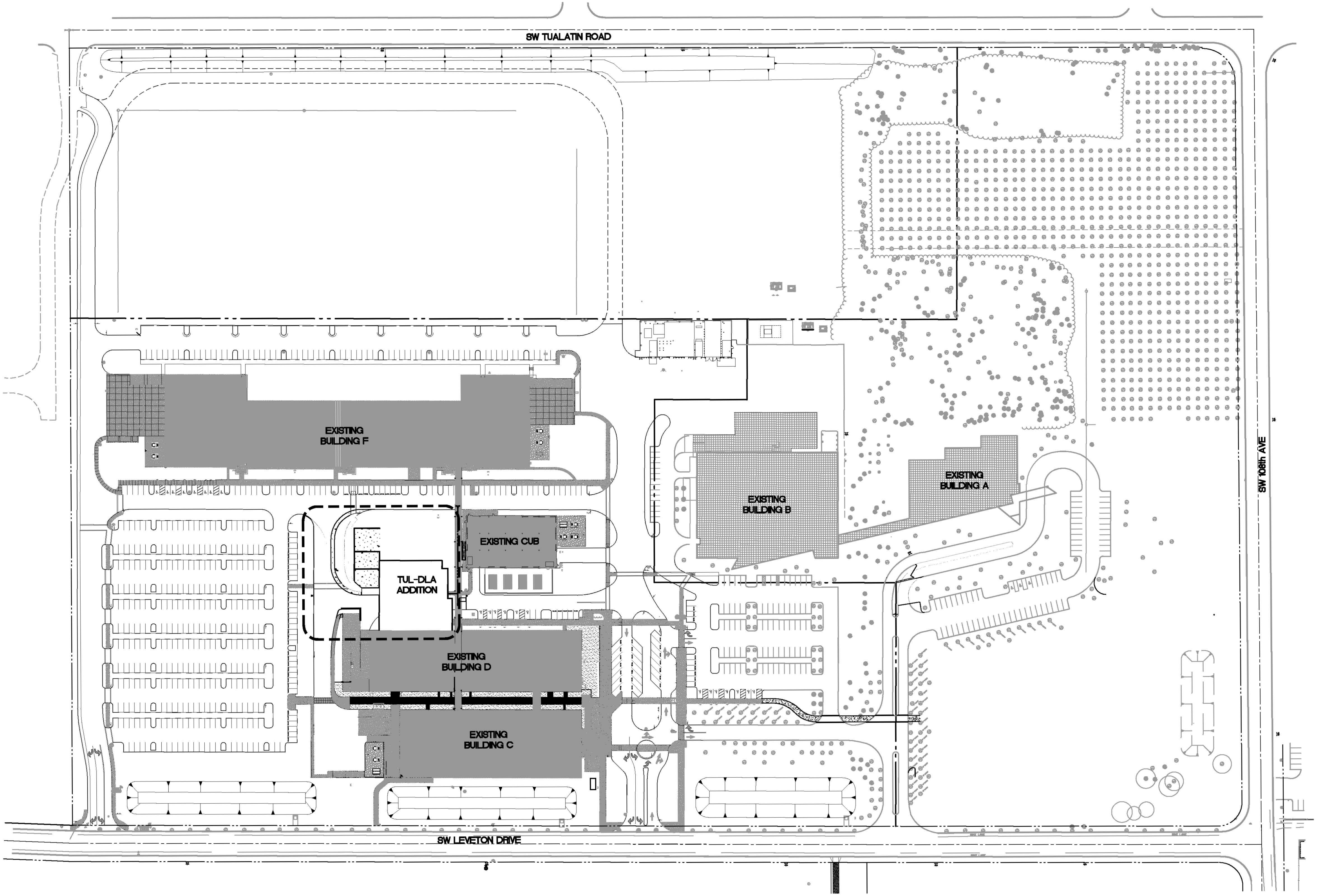
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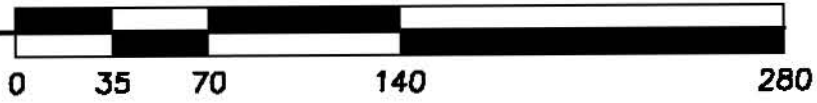
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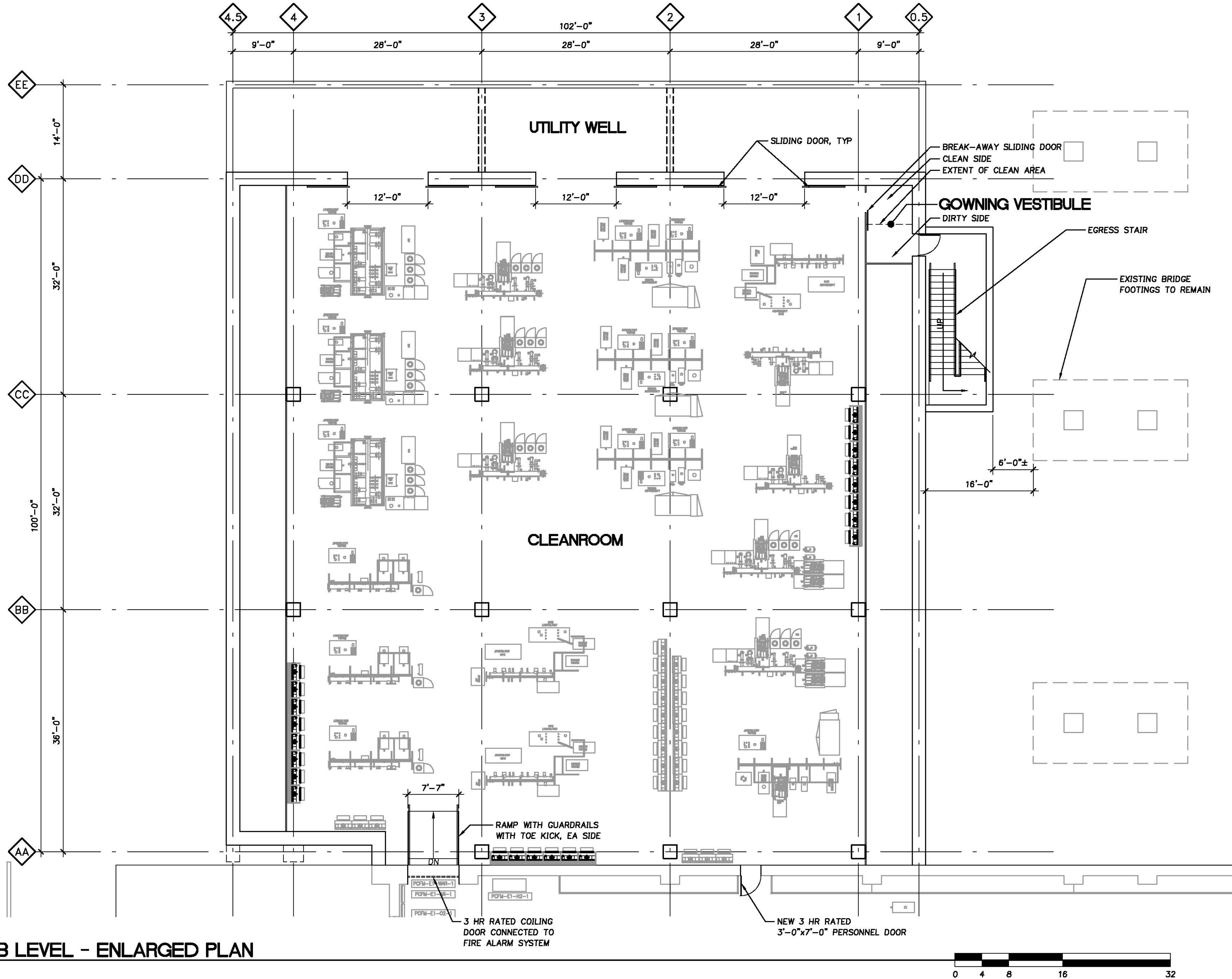
JOB NO. **2150163.00**

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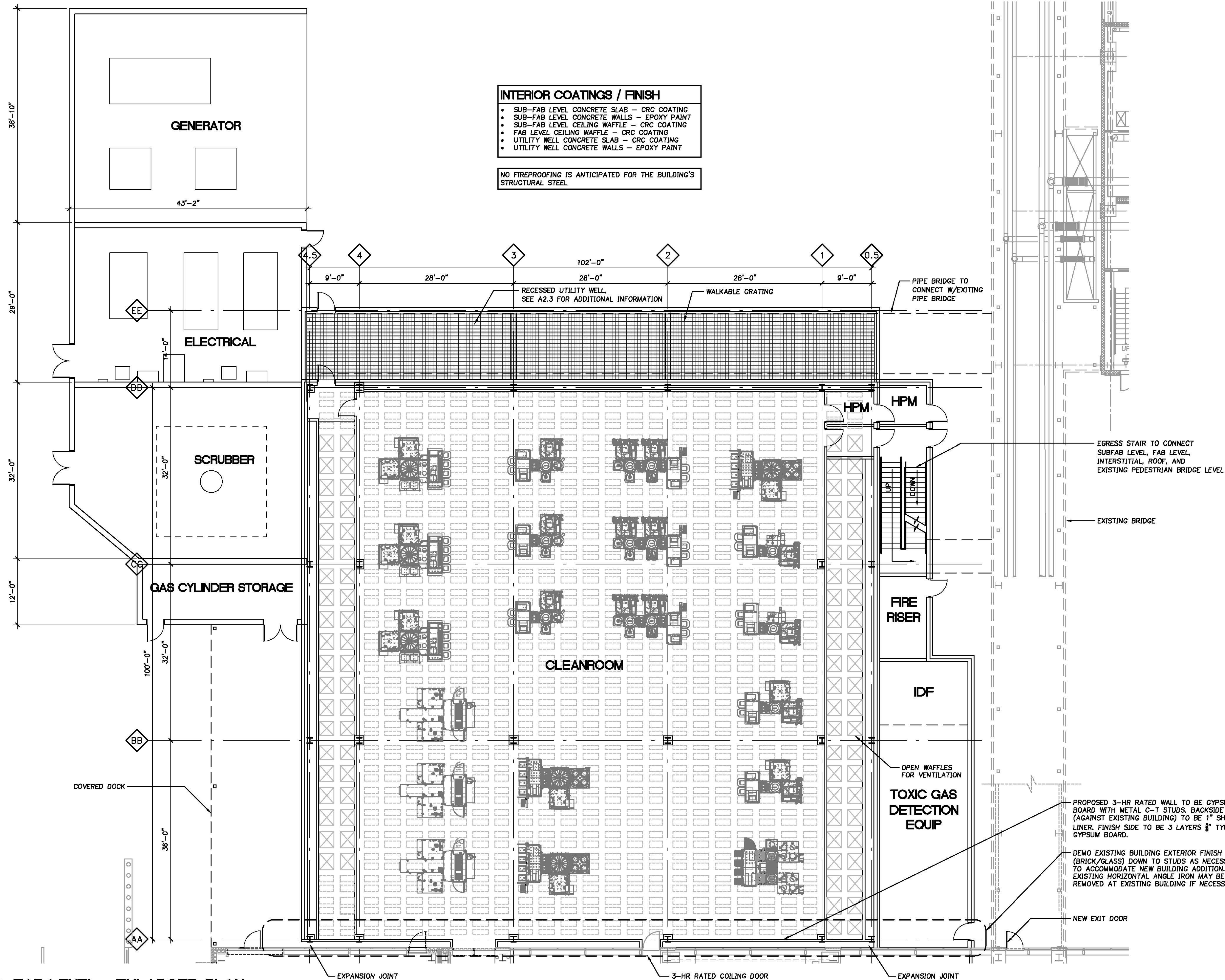


OVERALL SITE PLAN





NO.	REVISIONS THIS SHEET	REVISION CLOSING DATE



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STORMWATER REPORT

To

City of Tualatin

For

Lam Research
11357 SW Leveton Drive
Tualatin, OR 97062

Submitted

December 21, 2015

Project Number

2150163.00



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I.	PROJECT INTRODUCTION	1
II.	STORMWATER QUALITY TREATMENT	2
III.	STORMWATER QUANTITY CONTROL	3
IV.	STORMWATER CONVEYANCE.....	4
V.	CONCLUSIONS	5

ATTACHMENTS

1. Figure 1: C2.1 Site Plan
2. Figure 2: C2.2 Grading Plan
3. Figure 3: C2.3 Utility Plan
4. Appendix A: 2001-03-06 Revised Novellus Storm Calculations

II. STORMWATER QUALITY TREATMENT

Water quality was designed using the still relevant CWS requirements as described in the Novellus Storm Calculations (first 0.36" of rainfall in a four hour period). Stormwater Quality Treatment will be provided through an existing water quality and detention pond, designated as 'Pond B' in the Novellus Storm Calculations, located directly south of Building C. Pond B has been sized to treat 11.66 acres of impervious area, including asphalt paving, concrete paving, and building roof areas within the drainage basin. The existing drainage basin has 8.02 acres of impervious area and the proposed site development will have a net increase of 0.37 acres of impervious area. The total impervious area draining to Pond B after the Building D expansion will be 8.39 acres, leaving 3.27 acres of the 11.66 acre drainage basin for future development. The following table summarizes the existing and proposed site coverage.

	2015 Existing Impervious (acres)	Proposed Impervious (acres)
Design Impervious	11.66	11.66
Constructed Impervious	8.02	8.39 (0.37 net gain)
Unutilized Capacity	3.65	3.27

Based on our review of the 2000 Novellus Storm Calculations, the existing treatment systems at Lam Research (formally Novellus) meet current Clean Water Services standards for water quality treatment for the expansion of Building D.

III. STORMWATER QUANTITY CONTROL

The original Novellus site was designed to detain and release the developed site runoff to match peak pre-development runoff from the fully built out drainage basin. Stored rainfall volume will be stored above the expected water quality volume level in the basin. Runoff release from the pond will be controlled by an orifice control structure just downstream of the pond. Since Pond B was designed for an impervious area coverage greater than the proposed basin including the Building D Expansion, the pond has capacity to handle the runoff from the expansion.

Detailed runoff and pond detention calculations for Pond B are presented in the attached 2001 Storm Calculations.

IV. STORMWATER CONVEYANCE

The proposed Building D Expansion drainage system will collect runoff from the building roof and concrete sidewalk areas through catch basins and downspout scuppers. A network of storm pipes will convey runoff to the existing pond and then to the public storm line in SW Leveton Drive. The public line drains east from the site.

Per the Novellus Storm Calculations, all pipes have been designed to convey the 25-year storm using SCS methodology in accordance with CWS design standards. The runoff increase from the proposed Building D Expansion development is not expected to exceed the capacity of the existing onsite piping, so no conveyance changes are proposed. The piping design is presented in the attached 2001 Storm Calculations document.

V. CONCLUSIONS

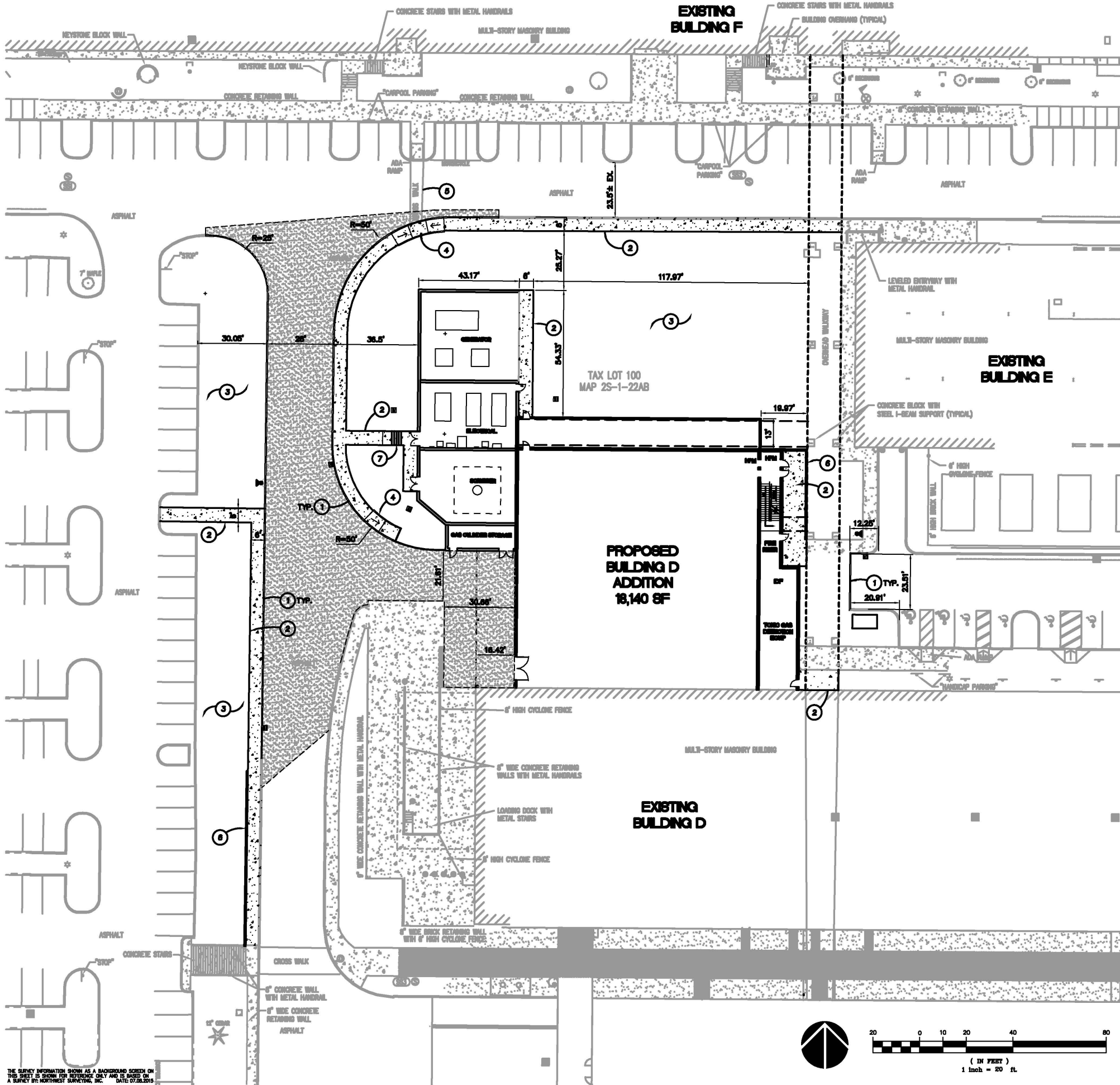
The proposed expansion of Building D on the Lam Research campus includes an 18,140 SF fabrication building with associated paved access aisles and sidewalk areas. The existing stormwater management system has been designed to accommodate full build out of the drainage basin.

Runoff from the proposed impervious surfaces will be routed to an existing water quality treatment pond, which has been designed according the Clean Water Services standards for water quality treatment and flow control. Treated and detained runoff from the pond will be discharged to the storm drain in SW Leveton Drive.



FIGURE 1

C2.1 SITE PLAN



LEGEND

- AC PAVING
- CONCRETE SIDEWALK
- VERTICAL CURB
- SAWCUT
- PROPOSED LIGHTPOLE
- EXISTING LIGHTPOLE
- RETAINING WALL

GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND THE REQUIREMENTS OF THE CITY OF TUALATIN, CLEAN WATER SERVICES (CWS), AND THE CURRENT AMERICAN PUBLIC WORKS ASSOCIATION STANDARDS FOR PUBLIC WORKS CONSTRUCTION.
- THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BOND OR ALLOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT, PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF THERE ARE ANY DISCREPANCIES.
- EFFECTIVE EROSION PREVENTION AND SEDIMENT CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED TO MEET CWS REQUIREMENTS. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
- EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE ROUTED SO THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
- CONTRACTOR SHALL ADJUST ALL STRUCTURES IMPACTED BY CONSTRUCTION IMPROVEMENTS TO NEW FINISH GRADES.
- EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 767.641 THROUGH 767.671. EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS SEVENTY-TWO (72) HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. (ONE CALL LOCATE UTILITY NOTIFICATION CENTER - PORTLAND METRO AREA 248-6886, OREGON 888-4848, ALL OTHER AREAS 1-800-332-2344).
- WHERE CONNECTING TO AN EXISTING PIPE, AND PRIOR TO ORDERING MATERIALS, THE CONTRACTOR SHALL EXPOSE THE END OF THE EXISTING PIPE, VERIFY THE LOCATION, SIZE, AND ELEVATION. NOTIFY ENGINEER OF ANY DISCREPANCIES.
- REQUEST BY THE CONTRACTOR FOR CHANGES TO THE PLANS MUST BE APPROVED BY THE ENGINEER.
- PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES.

KEYNOTES:

- CONCRETE VERTICAL CURB
- CONCRETE SIDEWALK
- LANDSCAPE AREA, SEE LANDSCAPE PLANS
- CURB RAMP
- REPAIR EXISTING ACCESSIBLE CROSS WALK STRIPING
- C.I.P. CONCRETE RETAINING WALL, MAX HEIGHT 2'
- CONCRETE STAIRS WITH HANDRAIL

SITE COVERAGE SUMMARY:

PAVING AND SIDEWALK	17,245 SF
BUILDING	18,140 SF
LANDSCAPE	17,800 SF
TOTAL AFFECTED AREA	53,185 SF

M.

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CHECKED BY: BON

SHEET:

C21

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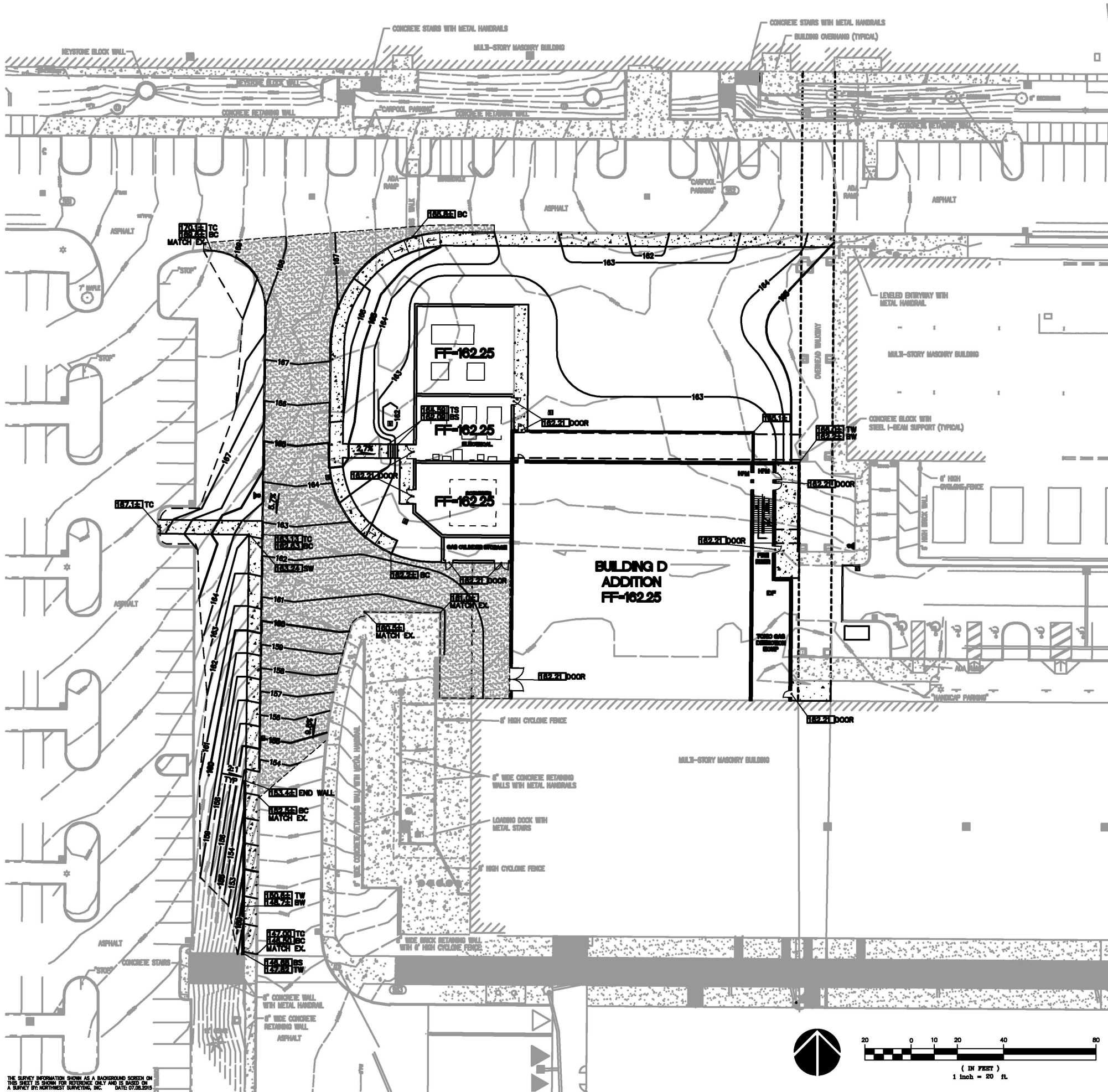
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FIGURE 2

C2.2 GRADING PLAN



LEGEND

- 161.0 SURFACE ELEVATION SPOT GRADE
- 105 SURFACE ELEVATION CONTOUR
- SHALE
- SAWCUT
- SLOPE ARROW

GRADING NOTES

1. ROUGH GRADING: BRING ALL FINISH GRADES TO APPROXIMATE LEVELS INDICATED. WHERE GRADES ARE NOT OTHERWISE INDICATED, FINISH GRADES ARE TO BE THE SAME AS ADJACENT SIDEWALKS, CURBS, OR THE OBVIOUS GRADE OF ADJACENT STRUCTURE. GRADE TO UNIFORM LEVELS OR SLOPES BETWEEN POINTS WHERE GRADES ARE GIVEN. ROUND OFF SURFACES, AVOID ABRUPT CHANGES IN LEVELS. ROUGH GRADE TO ALLOW FOR DEPTH OF CONCRETE SLABS, WALKS, AND THEIR BASE COURSES. GRADE FOR PAVED DRIVES AND PAVED PARKING AREAS AS INDICATED AND SPECIFIED HEREIN, AND PROVIDE FOR SURFACE DRAINAGE AS SHOWN, ALLOWING FOR THICKNESS OF SURFACING MATERIAL.
2. FINISH GRADING: AT COMPLETION OF JOB AND AFTER BACKFILLING BY OTHER CRAFTS HAS BEEN COMPLETED, REFINISH AND COMPACT AREAS WHICH HAVE SETTLED OR ERODED TO BRING TO FINAL GRADES. GRADING TOLERANCES: ROUGH GRADE AT PAVED OR LANDSCAPED AREAS: ± 0.1 FT. FINISH GRADE PRIOR TO PLACING FINAL SURFACING: ± 0.03 FT.
3. EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 787.541 THROUGH 787.571. EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS 72 HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
4. EFFECTIVE EROSION PREVENTION AND SEDIMENT CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED MEETING OHS REQUIREMENTS, THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
5. EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE SO ROUTED THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
6. SITE TOPSOIL SHALL BE STOCKPILED DURING CONSTRUCTION AND USED FOR LANDSCAPING.
7. THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS BASED ON A SURVEY BY NORTHWEST SURVEYING, AND IS SHOWN FOR REFERENCE ONLY. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS WITH HIS OWN RESOURCES PRIOR TO START OF ANY CONSTRUCTION.
8. CONTRACTOR TO COORDINATE GRADES AT ENTRANCE WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
9. SIX MAX SLOPE (EXCLUDING RAMPS) AT PEDESTRIAN SIDEWALK CONNECTIONS BETWEEN PUBLIC R.O.W. AND BUILDING ENTRANCES.
10. WHERE SLOPES ARE STEEPER THAN 3:1, CONTRACTOR SHALL INSTALL JUTE MATTING. SLOPE SHALL BE PREPARED TO ENSURE COMPLETE AND DIRECT CONTACT OF MATTING WITH SOIL. FOLLOW MANUFACTURER'S RECOMMENDATIONS.
11. ALL SPOT ELEVATIONS SHOWN ARE PAVEMENT GRADE UNLESS NOTED OTHERWISE ON PLANS.
12. GRADE ALL AREAS TO ENSURE POSITIVE DRAINAGE. NOTIFY ENGINEER IF ANY CONFLICTS.
13. PROTECT OVERHEAD WALKWAY DURING ALL CONSTRUCTION ACTIVITIES.

Client:

REVISIONS:

NO.	DATE	REVISION	BY	CHKD	DATE
1	12/18/15	DESIGN REVIEW	MDL	BDN	12/18/15

DRAWN BY: MDL

CHECKED BY: BDN

SHEET:

C2.2

FIGURE 3
C2.3 UTILITY PLAN



Z:\00000001\4 DRAWINGS\GEN\105-C2-3.DWG ISO 12/21/00 10:12 1:20

APPENDIX A

**2001-03-06 REVISED
NOVELLUS STORM
CALCULATIONS**

Storm Calculations

Novellus
Tualatin, Oregon

3.5



EXPIRES: 12/31/01

Project Number: 000321

Dated: 2/14/01

REVISED: 3/6/01

Description:

Novellus is located on the northwest corner of SW Leveton Drive and SW 108th Avenue. The site is comprised of approximately 58 acres. The site currently has two buildings remaining from the previous Oki site. The two buildings were purchased by Novellus along with the property.

Water quality will be provided for all of the site including the existing impervious areas. Water quality will be provided to meet USA requirements which are to treat the “summer” storm or the first 0.36" of rainfall falling in a four hour period. Dry detention ponds with a permanent pool will be the method employed to accomplish treatment. The ponds are sized for full build out of the Novellus Master Plan as submitted in the Industrial Master Plan with the City of Tualatin.

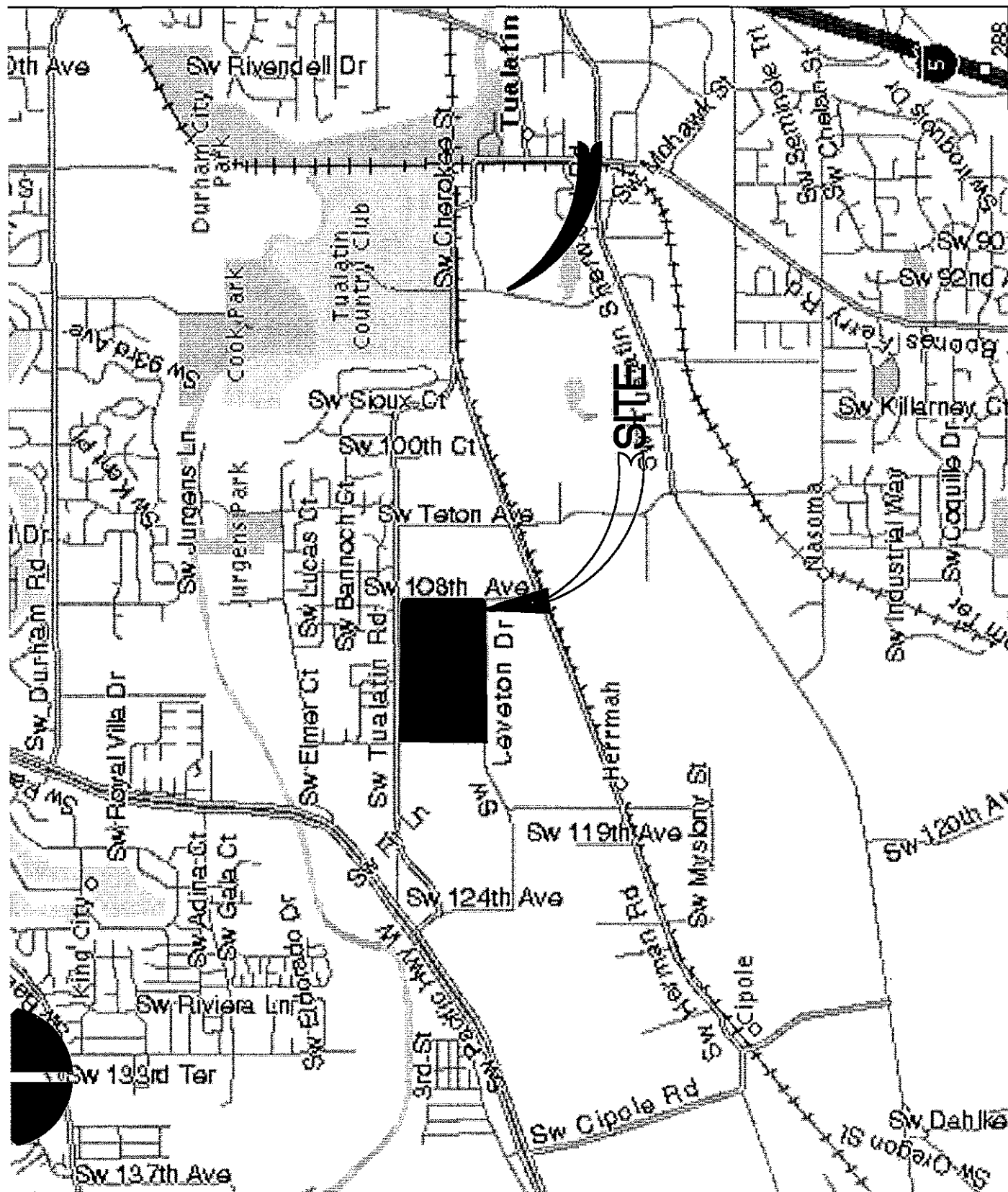
Detention will be provided to limit runoff from the site to match existing runoff for storms up to the 25yr event. Each pond will serve approximately 25% of the full built out site. The SCS based software program “WaterWorks” has been used to design the detention ponds.

All pipes have been designed to convey the 25yr storm using SCS methodology.

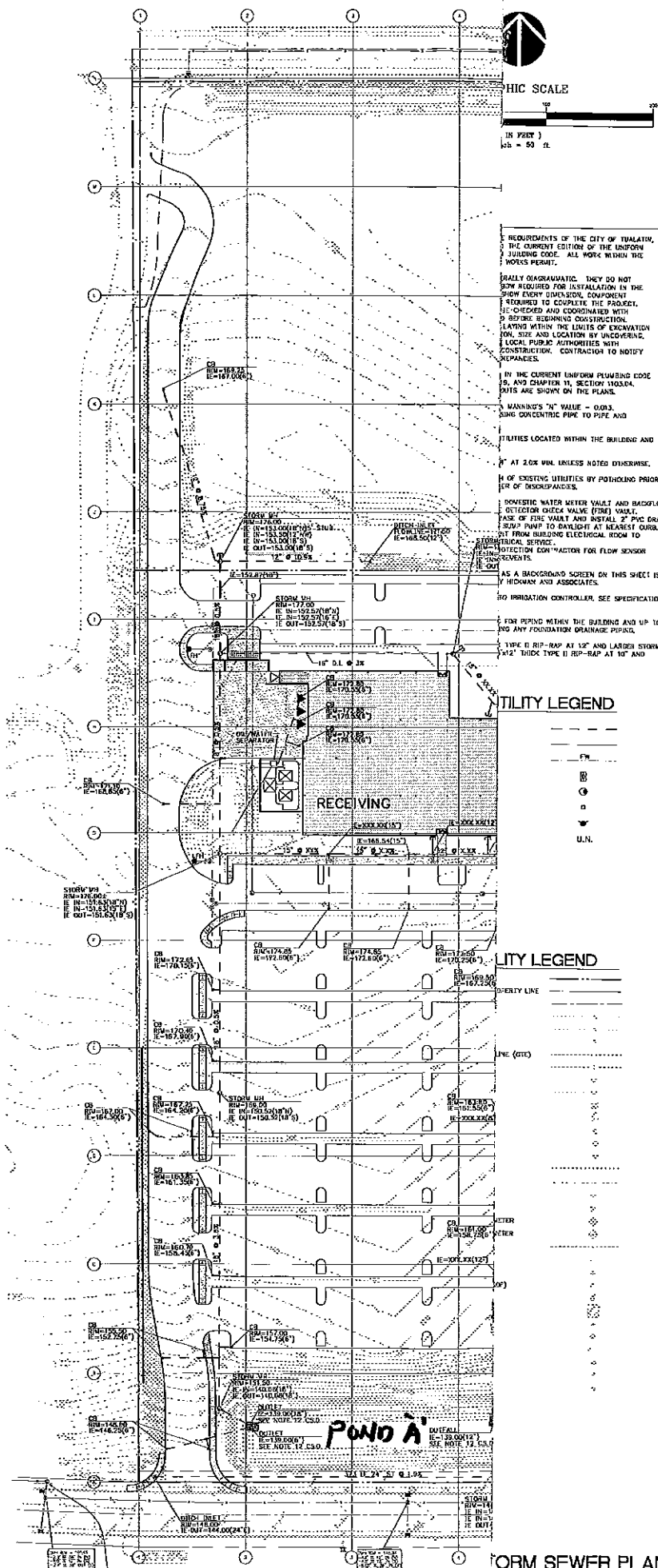
Table of Contents

A.	Vicinity Map
B.	Site Map
C.	Areas with full 'build-out'
D.	Water Quality Volumes required
E.	Detention Summary
F.	SCS Soils Map
G.	SCS Soils Classification
H.	SCS Curve Number
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J.	Pond 'A' Detention Volume
K.	Water Quality Orifice Sizing
L.	Pond 'A' Pond Outlet
M.	Pond 'A' computer detention calc's
N.	Pond 'B' Total Volume
O.	Pond 'B' Detention Volume
P.	Water Quality Orifice Sizing
Q.	Pond 'B' Pond Outlet
R.	Pond 'B' computer detention calc's
S.	Pond 'C' Total Volume
T.	Pond 'C' Detention Volume
U.	Water Quality Orifice Sizing
V.	Pond 'C' Pond Outlet
W.	Pond 'C' computer detention calc's
X.	Pipe sizing areas
Y.	Computer volumes for pipe sizing
Z.	Pipe sizing calc's

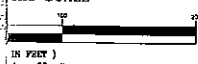
Attachment 'A' Drainage Map



'A' VICINITY MAP



GRAPHIC SCALE



REQUIREMENTS OF THE CITY OF TUALATIN, THE CURRENT EDITION OF THE UNIFORM BUILDING CODE. ALL WORK WITHIN THE WORKS PERMIT.

ALL UTILITIES SHOWN ARE BASED ON FIELD SURVEY DATA. THEY DO NOT SHOW REQUIRED FOR INSTALLATION IN THE WORKS PERMIT. THE CONTRACTOR IS REQUIRED TO COMPLETE THE PROJECT, BE CHECKED AND COORDINATED WITH THE CITY ENGINEER'S OFFICE. LAYING WITHIN THE LIMITS OF EXCAVATION, SIZE AND LOCATION BY UNCOVERING, LOCAL PUBLIC AUTHORITIES WITH CONSTRUCTION. CONTRACTOR TO NOTIFY NEARBY UTILITIES.

BY THE CURRENT UNIFORM PLUMBING CODE, AND CHAPTER 14, SECTION 1403.04, OUTS ARE SHOWN ON THE PLANS.

MANNING'S "N" VALUE = 0.013, USING CONCENTRIC PIPE TO PIPE AND

UTILITIES LOCATED WITHIN THE BUILDING AND

"N" AT 2.0% MIN. UNLESS NOTED OTHERWISE.

OF EXISTING UTILITIES BY POT-HOLING PRIOR TO DISMANTLING.

DOMESTIC WATER METER VAULT AND BACKFLOW DETECTION CHECK VALVE (TOD) VAULT, PUMP PUMP TO DAYLIGHT AT NEAREST CURB. FROM BUILDING ELECTRICAL ROOM TO ELECTRICAL SERVICE.

STORM WATER COLLECTION FACTOR FOR FLOW SENSOR

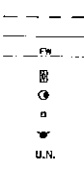
AS A BACKGROUND SCREEN ON THIS SHEET IS BY HIGHWAY AND ASSOCIATES.

NO IRRIGATION CONTROLLER, SEE SPECIFICATIONS

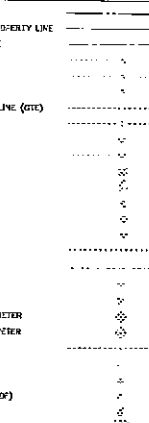
FOR PIPING WITHIN THE BUILDING AND UP TO ANY FOUNDATION DRAINAGE PIPING.

TYPE II RIP-RAP AT 12" AND LARGER STORM 12" THICK TYPE II RIP-RAP AT 10" AND

UTILITY LEGEND



UTILITY LEGEND



Project
**NOVELLUS
TUALATIN FACILITY**

Tualatin, Oregon

Architecture, Structural Engineer
Civil Engineer
Group Mackenzie
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REVISIONS:

NO.	DATE	REVISION	BY	DATE
1	02/01/01	ISSUED FOR PERMIT	MM	

SHEET TITLE:
**SITE
STORM
SEWER
PLAN
PHASE I**

FIRST ISSUED:
LAST ISSUED:
DRAWN BY:
CHECKED BY:

PROJECT
C5.0

GROUP MACKENZIE
JOB NO. 000321
CONTRACTOR
JOB NO.

FORM SEWER PLAN
GENERAL REVIEW: 02/01/01

'B'

'C' AREAS W/ FULL 'BUILD-OUT'

POND 'A'

TOTAL AREA	=	598,000 ϕ	=	13.72 AC
PERVIOUS AREA (15%)	=	89,700 ϕ	=	2.06 AC
IMPERVIOUS AREA (85%)	=	508,300 ϕ	=	11.66 AC

POND 'B'

TOTAL AREA	=	598,600 ϕ	=	13.72 AC
PERVIOUS AREA	=	89,700 ϕ	=	2.06 AC
IMPERVIOUS	=	508,300 ϕ	=	11.66 AC

POND 'C'

TOTAL AREA	=	643,500 ϕ	=	14.77 AC
PERVIOUS AREA	=	96,525 ϕ	=	2.22 AC
IMPERVIOUS AREA	=	546,975 ϕ	=	12.55 AC

GROUP

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Date _____

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'D' WQ VOLUMES REQUIRED

POND 'A'

$$VOL = 508,300 \text{ ft}^2 \times 0.36 \text{ in} \times \frac{1\text{ft}}{12 \text{ in}} = \underline{\underline{15,250 \text{ ft}^3}}$$

POND 'B'

$$VOL = 508,300 \text{ ft}^2 \times 0.36 \text{ in} \times \frac{1\text{ft}}{12 \text{ in}} = \underline{\underline{15,250 \text{ ft}^3}}$$

POND 'C'

$$VOL = 546,975 \text{ ft}^2 \times 0.36 \text{ in} \times \frac{1\text{ft}}{12 \text{ in}} = \underline{\underline{16,409 \text{ ft}^3}}$$

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'E' DETENTION SUMMARY

POND 'A'

	EXIST. (cfs)	DEVELOP. (cfs)	RELEASE (cfs)	PEAK STAGE	
2 YR	1.36	5.52	1.36	140.80	
10 YR	2.90	7.93	1.58	141.99	
25 YR	5.52	9.08	1.59	142.00	

POND 'B'

	EXIST. (cfs)	DEVEL. (cfs)	RELEASE (cfs)	PEAK STAGE	
2 YR	1.36	5.73	1.36	138.97	
10 YR	2.90	8.23	1.67	140.91	
25 YR	3.71	9.42	1.78	140.97	

POND 'C'

	EXIST. (cfs)	DEVEL. (cfs)	RELEASE (cfs)	PEAK STAGE	
2 YR	1.46	6.14	1.46	137.70	
10 YR	3.12	8.82	1.76	138.98	
25 YR	3.99	10.10	1.98	140.66	

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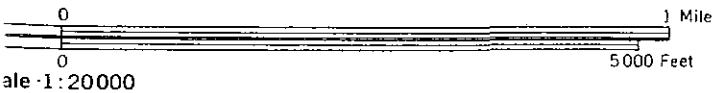
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(Joins sheet 44)



(Joins sheet 49)



'F' SOILS MAP

TABLE 13.—Soil and

[Absence of an entry indicates the feature is not a concern. See Glossary for descriptions of such

Soil name and map symbol	Hydro- logic group	Flooding		
		Frequency	Duration	Months
Aloha: 1	C	None		
Amity: 2	C	None		
Astoria: 3E, 3F	B	None		
Briedwell: 4B, 5B, 5C, 5D	B	None		
Carlton: 6B, 6C	B	None		
Cascade: 7B, 7C, 7D, 7E, 7F	C	None		
Chehalem: 8C	C	None		
Chehalis: 9, 10	B	Common	Brief	Nov-Mar
Cornelius: ¹ 11B, ¹ 11C, ¹ 11D, ¹ 11E, ¹ 11F: Cornelius part	C	None		
Kinton part	C	None		
Cornelius Variant: 12A, 12B, 12C	C	None		
Cove: 13, 14	D	Common	Brief	Dec-Apr
Dayton: 15	D	None		
Delena: 16C	D	None		
Goble: 17B, 17C, 17D, 17E, 18E, 18F	C	None		
Helvetia: 19B, 19C, 19D, 19E	C	None		
Hembre: 20E, 20F, 20G	B	None		
Hillsboro: 21A, 21B, 21C, 21D	B	None		
Huberly: 22	D	None		
Jory: 23B, 23C, 23D, 23E, 23F	C	None		
Kilchis: ¹ 24G: Kilchis part	C	None		
Klickitat part	B	None		

STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN

Table III-1.3 SCS Western Washington Runoff Curve Numbers
(Published by SCS in 1982) Runoff curve numbers for selected agricultural, suburban and urban land use for Type 1A rainfall distribution, 24-hour storm duration.

LAND USE DESCRIPTION	CURVE NUMBERS BY HYDROLOGIC SOIL GROUP			
	A	B	C	D
Cultivated land(1): winter condition	86	91	94	95
Mountain open areas: low growing brush & grasslands	74	82	89	92
Meadow or pasture:	65	78	85	89
Wood or forest land: undisturbed	42	64	76	81
Wood or forest land: young second growth or brush	55	72	81	86
Orchard: with cover crop	81	88	92	94
Open spaces, lawns, parks, golf courses, cemeteries, landscaping.				
Good condition: grass cover on $\geq 75\%$ of the area	68	80	86	90
Fair condition: grass cover on 50-75% of the area	77	85	90	92
Gravel roads & parking lots:	76	85	89	91
Dirt roads & parking lots:	72	82	87	89
Impervious surfaces, pavement, roofs etc.	98	98	98	98
Open water bodies: lakes, wetlands, ponds etc.	100	100	100	100
Single family residential(2):				
Dwelling Unit/Gross Acre %Impervious(3)				
1.0 DU/GA 15				
1.5 DU/GA 20				
2.0 DU/GA 25				
2.5 DU/GA 30				
3.0 DU/GA 34				
3.5 DU/GA 38				
4.0 DU/GA 42				
4.5 DU/GA 46				
5.0 DU/GA 48				
5.5 DU/GA 50				
6.0 DU/GA 52				
6.5 DU/GA 54				
7.0 DU/GA 56				
PUD's, condos, apartments, commercial businesses & industrial areas %impervious must be computed				
	Separate curve number shall be selected for pervious & impervious portions of the site or basin			

- (1) For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Sec. 4, Hydrology, Chapter 9, August 1972.
- (2) Assumes roof and driveway runoff is directed into street/storm system.
- (3) The remaining pervious areas (lawn) are considered to be in good condition for these curve numbers.

'I' - POND 'A' TOTAL VOLUME

ELEV. (FT)	AREA (SF)	VOL (CF)	Cumm. VOL (CF)
138	7015		
139	8904	7960	7960
140	10,849	9876	17,836 ← WQ VOL @ 139.75
141	12,851	11,850	29,686
142	14,909	13,880	43,566
143	17,024	15,967	59,532

WQ RELEASE RATE

$$\frac{15,250 \text{ ft}^3}{48 \text{ HRS}} \times \frac{1 \text{ hr}}{3600 \text{ s}} = 0.088 \text{ CS/s}$$

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J - POND 'A' DETENTION VOLUME

ELEV (FT)	AREA (SF)	VOL (CF)	CUMM VOL (CF)
139.75	10,363		
140	10,849	2652	2652
141	12,851	11,850	14,501
142	14,909	13,880	28,382
143	17,024	15,967	44,348

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'K' - WQ ORIFICE 'A'

$$Q = CA(2gh)^{1/2}$$

$$A = \frac{Q}{C(2gh)^{1/2}}$$

$$A = \frac{0.088}{0.62(2 \times 32.2 \times 2.10)^{1/2}}$$

$$A = 0.0122 \text{ ft}^2$$

$$d = \sqrt{\frac{4A}{\pi}} = 0.125' = \underline{\underline{1.50'' \phi}}$$

$$Q = 0.088$$

$$C = 0.62$$

$$g = 32.2$$

$$h = 139.75 - 137.65 = 2.10'$$

$$A = \frac{\pi d^2}{4}$$

$$d = \sqrt{\frac{4A}{\pi}}$$

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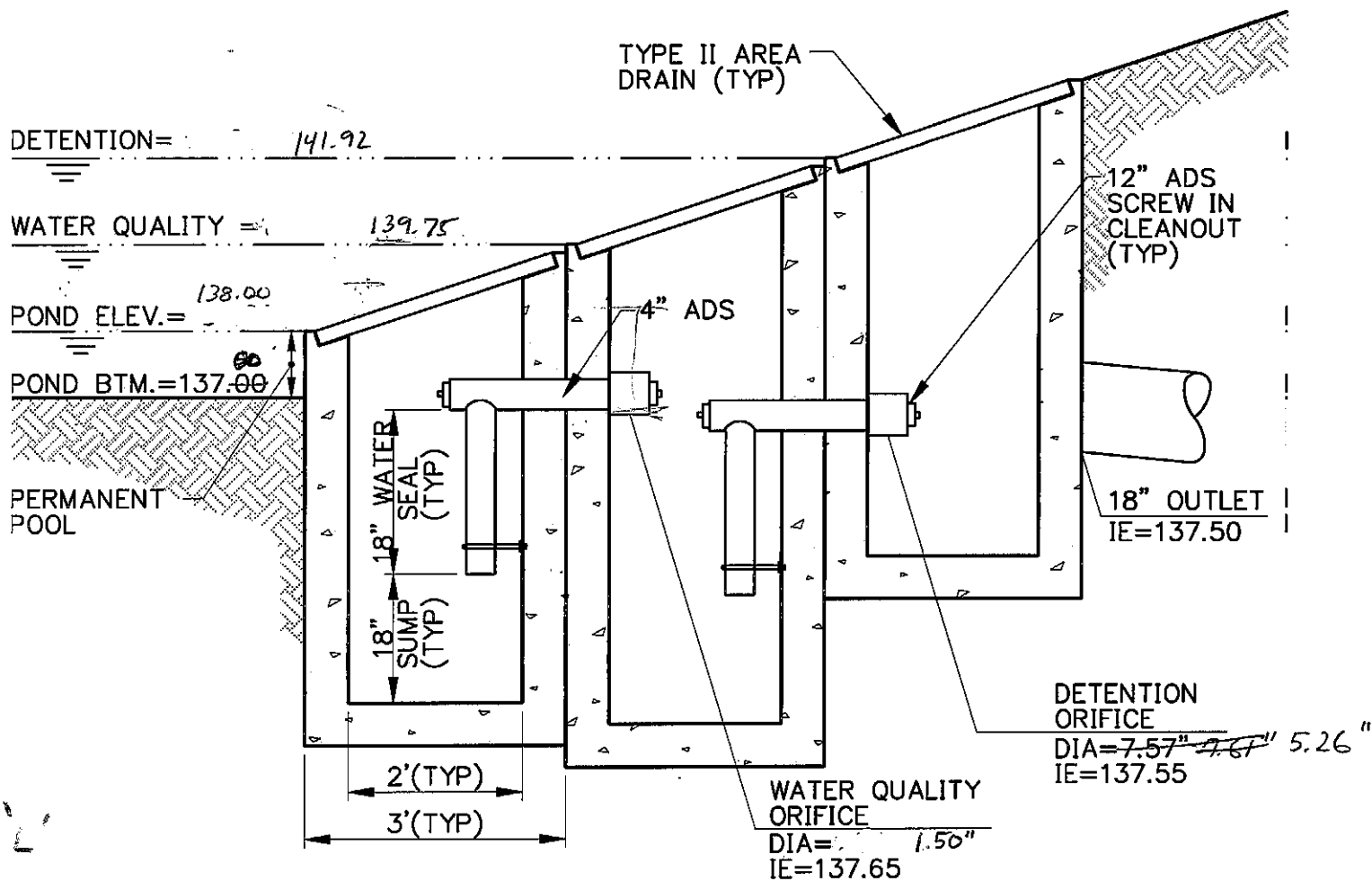
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1
C8.1

POND "A" OUTLET DETAIL

N.T.S.
OUTFLOW DEVICE

SD150
DETINSET= 1:1

NOVELLUS

=====

BASIN SUMMARY

BASIN ID: D10 NAME: DEVELOPED 10YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.45 inches AREA...: 2.06 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 17.67 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 11.66 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0020
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 7.93 cfs VOL: 3.40 Ac-ft TIME: 480 min

BASIN ID: D2 NAME: DEVELOPED 2YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 2.50 inches AREA...: 2.06 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 17.67 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 11.66 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0020
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 5.52 cfs VOL: 2.36 Ac-ft TIME: 480 min

BASIN ID: D25 NAME: DEVELOPED 25YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.90 inches AREA...: 2.06 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 17.67 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 11.66 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0020
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 9.08 cfs VOL: 3.90 Ac-ft TIME: 480 min

NOVELLUS

=====

BASIN SUMMARY

BASIN ID: E10 NAME: EXISTING 10YR STORM

SBUH METHODOLOGY

TOTAL AREA.....	13.72 Acres	BASEFLOWS:	0.00 cfs
RAINFALL TYPE.....	TYPE1A	PERVIOUS AREA	
PRECIPITATION.....	3.45 inches	AREA..	13.72 Acres
TIME INTERVAL.....	10.00 min	CN.....	80.00
TIME OF CONC.....	38.83 min	IMPERVIOUS AREA	
ABSTRACTION COEFF:	0.20	AREA..	0.00 Acres
		CN.....	98.00

TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400

TcReach - Shallow L: 300.00 ks:10.00 s:0.0400

TcReach - Channel L:1400.00 kc:17.00 s:0.0400

PEAK RATE: 2.90 cfs VOL: 1.83 Ac-ft TIME: 490 min

BASIN ID: E2 NAME: EXISTING 2YR STORM

SBUH METHODOLOGY

TOTAL AREA.....	13.72 Acres	BASEFLOWS:	0.00 cfs
RAINFALL TYPE.....	TYPE1A	PERVIOUS AREA	
PRECIPITATION.....	2.50 inches	AREA..	13.72 Acres
TIME INTERVAL.....	10.00 min	CN.....	80.00
TIME OF CONC.....	38.83 min	IMPERVIOUS AREA	
ABSTRACTION COEFF:	0.20	AREA..	0.00 Acres
		CN.....	98.00

TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400

TcReach - Shallow L: 300.00 ks:10.00 s:0.0400

TcReach - Channel L:1400.00 kc:17.00 s:0.0400

PEAK RATE: 1.36 cfs VOL: 1.02 Ac-ft TIME: 490 min

BASIN ID: E25 NAME: EXISTING 25YR STORM

SBUH METHODOLOGY

TOTAL AREA.....	13.72 Acres	BASEFLOWS:	0.00 cfs
RAINFALL TYPE.....	TYPE1A	PERVIOUS AREA	
PRECIPITATION.....	3.90 inches	AREA..	13.72 Acres
TIME INTERVAL.....	10.00 min	CN.....	80.00
TIME OF CONC.....	38.83 min	IMPERVIOUS AREA	
ABSTRACTION COEFF:	0.20	AREA..	0.00 Acres
		CN.....	98.00

TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400

TcReach - Shallow L: 300.00 ks:10.00 s:0.0400

TcReach - Channel L:1400.00 kc:17.00 s:0.0400

PEAK RATE: 3.71 cfs VOL: 2.24 Ac-ft TIME: 490 min

NOVELLUS

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HYDROGRAPH SUMMARY

HYD NUM	PEAK RUNOFF RATE cfs	TIME OF PEAK min.	VOLUME OF HYDRO cf\AcFt	Contrib Area Acres
1	1.356	490	44270 cf	13.72
2	2.902	490	79526 cf	13.72
3	3.714	490	97581 cf	13.72
5	5.522	480	102758 cf	13.72
6	7.929	480	148087 cf	13.72
7	9.079	480	169790 cf	13.72
10	1.355	700	102983 cf	13.72
11	1.584	630	35096 cf	13.72
12	1.570	530	27536 cf	13.72

NOVELLUS

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STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 137.55
Elev: 137.55 ft Orifice Diameter: 5.2617 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
137.55	0.0000	0.0000	0.0000	139.10	3837	0.9354	13.725	140.70	24218	1.3334	82.059
137.60	0.0000	0.1680	0.1680	139.20	5022	0.9651	17.704	140.80	25606	1.3544	86.707
137.70	0.0000	0.2910	0.2910	139.30	6207	0.9939	21.683	140.90	26994	1.3751	91.355
137.80	0.0000	0.3757	0.3757	139.40	7392	1.0219	25.661	141.00	28382	1.3955	96.002
137.90	0.0000	0.4445	0.4445	139.50	8577	1.0491	29.637	141.10	29979	1.4156	101.34
138.00	0.0000	0.5040	0.5040	139.60	9761	1.0757	33.614	141.20	31575	1.4354	106.69
138.10	0.0000	0.5572	0.5572	139.70	10946	1.1016	37.589	141.30	33172	1.4549	112.03
138.20	0.0000	0.6057	0.6057	139.80	12131	1.1270	41.564	141.40	34768	1.4742	117.37
138.30	0.0000	0.6507	0.6507	139.90	13316	1.1517	45.539	141.50	36365	1.4932	122.71
138.40	0.0000	0.6927	0.6927	140.00	14501	1.1760	49.513	141.60	37962	1.5120	128.05
138.50	0.0000	0.7323	0.7323	140.10	15889	1.1997	54.163	141.70	39558	1.5305	133.39
138.60	0.0000	0.7699	0.7699	140.20	17277	1.2230	58.814	141.80	41155	1.5489	138.73
138.70	0.0000	0.8057	0.8057	140.30	18665	1.2459	63.464	141.90	42751	1.5670	144.07
138.80	530.40	0.8400	2.6080	140.40	20053	1.2684	68.113				
138.90	1591	0.8729	6.1769	140.50	21442	1.2904	72.762				
139.00	2652	0.9047	9.7447	140.60	22830	1.3121	77.411				

NOVELLUS

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 1.36 INFLOW Q (cfs): 5.52
 PEAK STAGE (ft): 140.80 PEAK OUTFLOW : 1.36
 PEAK TIME: 700.00 min.
 INFLOW HYD No. : 5 OUTFLOW HYD No.: 10

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE (ft)	TIME (min)
<----- cfs min ----->							
0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	137.55	50.00
0.0001	0.0062	0.0000	0.0063	0.0001	0.0062	137.55	60.00
0.0062	0.0358	0.0000	0.0420	0.0062	0.0358	137.55	70.00
0.0358	0.0902	0.0000	0.1259	0.0358	0.0902	137.55	80.00
0.0902	0.1532	0.0000	0.2434	0.0902	0.1532	137.55	90.00
0.1532	0.2163	0.0000	0.3695	0.1532	0.2163	137.55	100.00
0.2163	0.2756	0.0000	0.4919	0.2163	0.2756	137.55	110.00
0.2756	0.3295	0.0000	0.6051	0.2756	0.3295	137.55	120.00
0.3295	0.3947	0.0000	0.7242	0.3295	0.3947	137.55	130.00
0.3947	0.4686	0.0000	0.8633	0.3947	0.4686	137.55	140.00
0.4686	0.5284	0.0000	0.9970	0.4686	0.5284	137.55	150.00
0.5284	0.5757	0.0000	1.1042	0.5284	0.5757	137.55	160.00
0.5757	0.6188	0.0000	1.1946	0.5757	0.6188	137.55	170.00
0.6188	0.6554	0.0000	1.2742	0.6188	0.6554	137.55	180.00
0.6554	0.6842	0.0000	1.3396	0.6554	0.6842	137.55	190.00
0.6842	0.7129	0.0000	1.3971	0.6842	0.7129	137.55	200.00
0.7129	0.7378	0.0000	1.4507	0.7129	0.7378	137.55	210.00
0.7378	0.7566	0.0000	1.4944	0.7378	0.7566	137.55	220.00
0.7566	0.7773	0.0000	1.5339	0.7566	0.7773	137.55	230.00
0.7773	0.7952	0.0000	1.5725	0.7773	0.7952	137.55	240.00
0.7952	0.8366	0.0000	1.6319	0.7952	0.8366	137.55	250.00
0.8366	0.8912	0.0304	1.7583	0.8063	0.9520	138.70	260.00
0.8912	0.9280	0.1435	1.9627	0.8085	1.1543	138.71	270.00
0.9280	0.9574	0.3419	2.2273	0.8123	1.4150	138.72	280.00
0.9574	0.9756	0.5977	2.5306	0.8173	1.7133	138.73	290.00
0.9756	0.9904	0.8904	2.8563	0.8230	2.0334	138.75	300.00
0.9904	1.1189	1.2043	3.3136	0.8291	2.4846	138.77	310.00
1.1189	1.3095	1.6469	4.0754	0.8376	3.2377	138.79	320.00
1.3095	1.4235	2.3919	5.1249	0.8458	4.2791	138.82	330.00
1.4235	1.4938	3.4237	6.3410	0.8554	5.4856	138.85	340.00
1.4938	1.5398	4.6191	7.6527	0.8666	6.7861	138.88	350.00
1.5398	1.5727	5.9077	9.0202	0.8784	8.1418	138.92	360.00
1.5727	1.5694	7.2514	10.393	0.8904	9.5031	138.96	370.00
1.5694	1.5448	8.6005	11.715	0.9025	10.812	138.99	380.00
1.5448	1.5328	9.8993	12.977	0.9129	12.064	139.03	390.00
1.5328	1.5311	11.141	14.205	0.9226	13.283	139.06	400.00
1.5311	1.5386	12.351	15.421	0.9320	14.489	139.09	410.00
1.5386	1.5435	13.548	16.630	0.9411	15.689	139.12	420.00
1.5435	1.9599	14.739	18.242	0.9500	17.292	139.15	430.00
1.9599	2.6167	16.330	20.907	0.9620	19.945	139.19	440.00
2.6167	3.0001	18.963	24.580	0.9813	23.599	139.26	450.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs			min	----->			(ft)
							(min)
3.0001	3.8181	22.591	29.410	1.0074	28.402	139.35	460.00
3.8181	4.8896	27.362	36.069	1.0407	35.029	139.47	470.00
4.8896	5.5224	33.944	44.356	1.0849	43.271	139.64	480.00
5.5224	5.0947	42.133	52.750	1.1376	51.613	139.84	490.00
5.0947	4.0608	50.426	59.582	1.1867	58.395	140.05	500.00
4.0608	3.4876	57.174	64.722	1.2209	63.501	140.19	510.00
3.4876	3.1022	62.255	68.845	1.2461	67.599	140.30	520.00
3.1022	2.8252	66.333	72.261	1.2659	70.995	140.39	530.00
2.8252	2.6735	69.713	75.211	1.2820	73.929	140.46	540.00
2.6735	2.4188	72.633	77.726	1.2959	76.430	140.53	550.00
2.4188	2.1056	75.122	79.647	1.3075	78.339	140.58	560.00
2.1056	1.9318	77.023	81.060	1.3164	79.744	140.62	570.00
1.9318	1.8402	78.421	82.193	1.3228	80.870	140.65	580.00
1.8402	1.7861	79.542	83.169	1.3280	81.841	140.67	590.00
1.7861	1.7572	80.508	84.052	1.3324	82.719	140.70	600.00
1.7572	1.7089	81.383	84.849	1.3364	83.512	140.71	610.00
1.7089	1.6498	82.172	85.531	1.3400	84.191	140.73	620.00
1.6498	1.6177	82.848	86.115	1.3431	84.772	140.75	630.00
1.6177	1.5965	83.427	86.641	1.3457	85.295	140.76	640.00
1.5965	1.5897	83.947	87.133	1.3481	85.785	140.77	650.00
1.5897	1.5869	84.435	87.612	1.3503	86.261	140.78	660.00
1.5869	1.5149	84.909	88.011	1.3524	86.658	140.79	670.00
1.5149	1.4041	85.304	88.223	1.3542	86.869	140.80	680.00
1.4041	1.3427	85.514	88.260	1.3552	86.905	140.80	690.00
1.3427	1.3131	85.550	88.206	1.3553	86.850	140.80	700.00
1.3131	1.2929	85.495	88.101	1.3551	86.746	140.80	710.00
1.2929	1.2822	85.392	87.967	1.3546	86.612	140.80	720.00
1.2822	1.2808	85.258	87.821	1.3540	86.467	140.80	730.00
1.2808	1.2764	85.114	87.671	1.3534	86.318	140.79	740.00
1.2764	1.2744	84.965	87.516	1.3527	86.163	140.79	750.00
1.2744	1.2780	84.811	87.364	1.3520	86.012	140.79	760.00
1.2780	1.2762	84.660	87.214	1.3513	85.863	140.79	770.00
1.2762	1.2757	84.513	87.065	1.3506	85.714	140.78	780.00
1.2757	1.2081	84.364	86.848	1.3499	85.498	140.78	790.00
1.2081	1.0987	84.149	86.456	1.3490	85.107	140.77	800.00
1.0987	1.0378	83.759	85.896	1.3472	84.549	140.77	810.00
1.0378	1.0040	83.204	85.246	1.3447	83.901	140.75	820.00
1.0040	0.9854	82.559	84.549	1.3418	83.207	140.74	830.00
0.9854	0.9752	81.868	83.829	1.3386	82.490	140.72	840.00
0.9752	1.0037	81.155	83.134	1.3354	81.798	140.71	850.00
1.0037	1.0582	80.466	82.528	1.3322	81.196	140.69	860.00
1.0582	1.0890	79.866	82.014	1.3295	80.684	140.68	870.00
1.0890	1.1022	79.357	81.548	1.3271	80.221	140.67	880.00
1.1022	1.1142	78.896	81.112	1.3250	79.787	140.66	890.00
1.1142	1.1212	78.464	80.700	1.3230	79.377	140.65	900.00
1.1212	1.1211	78.056	80.298	1.3211	78.977	140.64	910.00
1.1211	1.1257	77.658	79.904	1.3193	78.585	140.63	920.00

NOVELLUS

LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
1.1257	1.1285	77.268	79.522	1.3175	78.204	140.63	930.00
1.1285	1.1261	76.889	79.143	1.3157	77.828	140.62	940.00
1.1261	1.1293	76.513	78.769	1.3140	77.455	140.61	950.00
1.1293	1.1314	76.143	78.403	1.3123	77.091	140.60	960.00
1.1314	1.0216	75.780	77.933	1.3106	76.623	140.59	970.00
1.0216	0.8577	75.314	77.194	1.3084	75.885	140.58	980.00
0.8577	0.7661	74.580	76.204	1.3050	74.899	140.57	990.00
0.7661	0.7108	73.599	75.076	1.3004	73.775	140.55	1000.00
0.7108	0.6842	72.480	73.875	1.2951	72.580	140.52	1010.00
0.6842	0.6695	71.290	72.644	1.2895	71.355	140.50	1020.00
0.6695	0.7299	70.071	71.470	1.2837	70.187	140.47	1030.00
0.7299	0.8367	68.908	70.475	1.2782	69.197	140.44	1040.00
0.8367	0.8966	67.923	69.657	1.2735	68.383	140.42	1050.00
0.8966	0.9303	67.113	68.940	1.2696	67.671	140.41	1060.00
0.9303	0.9493	66.404	68.284	1.2662	67.018	140.39	1070.00
0.9493	0.9601	65.755	67.664	1.2631	66.401	140.38	1080.00
0.9601	0.9319	65.141	67.033	1.2601	65.773	140.36	1090.00
0.9319	0.8776	64.516	66.325	1.2571	65.068	140.35	1100.00
0.8776	0.8474	63.815	65.540	1.2536	64.286	140.33	1110.00
0.8474	0.9641	63.036	64.848	1.2499	63.598	140.32	1120.00
0.9641	0.8960	62.351	64.211	1.2465	62.965	140.30	1130.00
0.8960	0.7289	61.721	63.346	1.2434	62.103	140.29	1140.00
0.7289	0.7691	60.863	62.361	1.2392	61.122	140.27	1150.00
0.7691	0.7874	59.888	61.444	1.2344	60.210	140.25	1160.00
0.7874	0.7977	58.980	60.565	1.2299	59.335	140.23	1170.00
0.7977	0.8079	58.110	59.715	1.2256	58.490	140.21	1180.00
0.8079	0.8094	57.268	58.885	1.2214	57.664	140.19	1190.00
0.8094	0.8104	56.447	58.067	1.2173	56.849	140.18	1200.00
0.8104	0.8153	55.636	57.262	1.2132	56.049	140.16	1210.00
0.8153	0.8139	54.839	56.469	1.2092	55.259	140.14	1220.00
0.8139	0.8132	54.054	55.681	1.2052	54.476	140.12	1230.00
0.8132	0.8173	53.275	54.905	1.2013	53.704	140.11	1240.00
0.8173	0.8153	52.507	54.139	1.1974	52.942	140.09	1250.00
0.8153	0.8143	51.748	53.378	1.1935	52.184	140.07	1260.00
0.8143	0.8182	50.995	52.627	1.1896	51.438	140.06	1270.00
0.8182	0.8162	50.252	51.886	1.1858	50.701	140.04	1280.00
0.8162	0.8152	49.519	51.150	1.1820	49.968	140.03	1290.00
0.8152	0.8190	48.790	50.424	1.1783	49.245	140.01	1300.00
0.8190	0.8169	48.071	49.707	1.1744	48.533	139.99	1310.00
0.8169	0.8159	47.363	48.995	1.1700	47.825	139.98	1320.00
0.8159	0.7808	46.660	48.256	1.1657	47.091	139.96	1330.00
0.7808	0.7266	45.930	47.437	1.1612	46.276	139.94	1340.00
0.7266	0.6963	45.119	46.542	1.1562	45.386	139.92	1350.00
0.6963	0.6752	44.235	45.607	1.1508	44.456	139.90	1360.00
0.6752	0.6677	43.311	44.654	1.1450	43.509	139.87	1370.00
0.6677	0.6637	42.370	43.701	1.1391	42.562	139.85	1380.00
0.6637	0.6571	41.429	42.750	1.1332	41.617	139.83	1390.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<-----		cfs	min	----->		(ft)	(min)
=====							
0.6571	0.6578	40.489	41.804	1.1273	40.677	139.80	1400.00
0.6578	0.6583	39.556	40.872	1.1213	39.751	139.78	1410.00
0.6583	0.6543	38.635	39.948	1.1154	38.832	139.75	1420.00
0.6543	0.6565	37.723	39.034	1.1096	37.924	139.73	1430.00
0.6565	0.6577	36.820	38.135	1.1038	37.031	139.71	1440.00
0.6577	0.5109	35.933	37.101	1.0980	36.003	139.69	1450.00
0.5109	0.2855	34.912	35.709	1.0913	34.617	139.66	1460.00
0.2855	0.1596	33.535	33.980	1.0823	32.898	139.63	1470.00
0.1596	0.0892	31.827	32.076	1.0709	31.005	139.58	1480.00
0.0892	0.0499	29.947	30.086	1.0583	29.027	139.53	1490.00
0.0499	0.0279	27.982	28.060	1.0450	27.015	139.48	1500.00
0.0279	0.0156	25.984	26.027	1.0312	24.996	139.43	1510.00
0.0156	0.0087	23.979	24.003	1.0172	22.986	139.38	1520.00
0.0087	0.0049	21.983	21.997	1.0031	20.993	139.33	1530.00
0.0049	0.0027	20.005	20.012	0.9889	19.023	139.28	1540.00
0.0027	0.0015	18.049	18.053	0.9746	17.078	139.23	1550.00
0.0015	0.0008	16.118	16.120	0.9604	15.160	139.18	1560.00
0.0008	0.0005	14.214	14.215	0.9461	13.269	139.14	1570.00
0.0005	0.0003	12.337	12.338	0.9319	11.406	139.09	1580.00
0.0003	0.0001	10.489	10.489	0.9175	9.5714	139.04	1590.00
0.0001	0.0001	8.6683	8.6685	0.9032	7.7654	139.00	1600.00
0.0001	0.0000	6.8783	6.8784	0.8871	5.9913	138.94	1610.00
0.0000	0.0000	5.1201	5.1202	0.8712	4.2490	138.89	1620.00
0.0000	0.0000	3.3938	3.3939	0.8551	2.5387	138.85	1630.00
0.0000	0.0000	1.7001	1.7001	0.8387	0.8614	138.80	1640.00
0.0000	0.0000	0.0547	0.0547	0.8067	-0.7521	138.70	1650.00

NOVELLUS

ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 137.55
Elev: 137.55 ft Orifice Diameter: 5.2617 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
137.55	0.0000	0.0000	0.0000	139.10	3837	0.9354	13.725	140.70	24218	1.3334	82.059
137.60	0.0000	0.1680	0.1680	139.20	5022	0.9651	17.704	140.80	25606	1.3544	86.707
137.70	0.0000	0.2910	0.2910	139.30	6207	0.9939	21.683	140.90	26994	1.3751	91.355
137.80	0.0000	0.3757	0.3757	139.40	7392	1.0219	25.661	141.00	28382	1.3955	96.002
137.90	0.0000	0.4445	0.4445	139.50	8577	1.0491	29.637	141.10	29979	1.4156	101.34
138.00	0.0000	0.5040	0.5040	139.60	9761	1.0757	33.614	141.20	31575	1.4354	106.69
138.10	0.0000	0.5572	0.5572	139.70	10946	1.1016	37.589	141.30	33172	1.4549	112.03
138.20	0.0000	0.6057	0.6057	139.80	12131	1.1270	41.564	141.40	34768	1.4742	117.37
138.30	0.0000	0.6507	0.6507	139.90	13316	1.1517	45.539	141.50	36365	1.4932	122.71
138.40	0.0000	0.6927	0.6927	140.00	14501	1.1760	49.513	141.60	37962	1.5120	128.05
138.50	0.0000	0.7323	0.7323	140.10	15889	1.1997	54.163	141.70	39558	1.5305	133.39
138.60	0.0000	0.7699	0.7699	140.20	17277	1.2230	58.814	141.80	41155	1.5489	138.73
138.70	0.0000	0.8057	0.8057	140.30	18665	1.2459	63.464	141.90	42751	1.5670	144.07
138.80	530.40	0.8400	2.6080	140.40	20053	1.2684	68.113				
138.90	1591	0.8729	6.1769	140.50	21442	1.2904	72.762				
139.00	2652	0.9047	9.7447	140.60	22830	1.3121	77.411				

NOVELLUS

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 2.90 INFLOW Q (cfs): 7.93
 PEAK STAGE (ft): 141.99 PEAK OUTFLOW : 1.58
 PEAK TIME: 630.00 min.
 INFLOW HYD No. : 6 OUTFLOW HYD No.: 11

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0019	0.0000	0.0019	0.0000	0.0019	137.55	40.00
0.0019	0.0209	0.0000	0.0229	0.0019	0.0209	137.55	50.00
0.0209	0.0630	0.0000	0.0839	0.0209	0.0630	137.55	60.00
0.0630	0.1440	0.0000	0.2070	0.0630	0.1440	137.55	70.00
0.1440	0.2565	0.0000	0.4005	0.1440	0.2565	137.55	80.00
0.2565	0.3646	0.0000	0.6211	0.2565	0.3646	137.55	90.00
0.3646	0.4624	0.0000	0.8270	0.3646	0.4624	137.55	100.00
0.4624	0.5481	0.0000	1.0104	0.4624	0.5481	137.55	110.00
0.5481	0.6221	0.0000	1.1701	0.5481	0.6221	137.55	120.00
0.6221	0.7143	0.0000	1.3364	0.6221	0.7143	137.55	130.00
0.7143	0.8201	0.0000	1.5344	0.7143	0.8201	137.55	140.00
0.8201	0.9008	0.0142	1.7351	0.8060	0.9291	138.70	150.00
0.9008	0.9604	0.1211	1.9823	0.8080	1.1743	138.71	160.00
0.9604	1.0135	0.3615	2.3355	0.8127	1.5228	138.72	170.00
1.0135	1.0568	0.7035	2.7738	0.8193	1.9544	138.74	180.00
1.0568	1.0886	1.1269	3.2723	0.8275	2.4447	138.76	190.00
1.0886	1.1211	1.6078	3.8176	0.8369	2.9807	138.79	200.00
1.1211	1.1484	2.1373	4.4068	0.8434	3.5634	138.81	210.00
1.1484	1.1673	2.7146	5.0303	0.8488	4.1814	138.83	220.00
1.1673	1.1896	3.3269	5.6838	0.8545	4.8293	138.84	230.00
1.1896	1.2085	3.9688	6.3669	0.8605	5.5064	138.86	240.00
1.2085	1.2628	4.6396	7.1110	0.8667	6.2442	138.88	250.00
1.2628	1.3370	5.3707	7.9705	0.8735	7.0970	138.90	260.00
1.3370	1.3845	6.2159	8.9374	0.8811	8.0563	138.93	270.00
1.3845	1.4213	7.1667	9.9725	0.8897	9.0828	138.95	280.00
1.4213	1.4427	8.1840	11.048	0.8988	10.149	138.98	290.00
1.4427	1.4610	9.2414	12.145	0.9078	11.237	139.01	300.00
1.4610	1.6480	10.321	13.430	0.9162	12.514	139.04	310.00
1.6480	1.9273	11.588	15.163	0.9260	14.237	139.07	320.00
1.9273	2.0950	13.298	17.320	0.9392	16.381	139.11	330.00
2.0950	2.1991	15.426	19.720	0.9552	18.765	139.17	340.00
2.1991	2.2669	17.792	22.258	0.9728	21.285	139.23	350.00
2.2669	2.3136	20.294	24.875	0.9910	23.884	139.29	360.00
2.3136	2.3054	22.874	27.493	1.0094	26.484	139.36	370.00
2.3054	2.2653	25.456	30.027	1.0275	29.000	139.42	380.00
2.2653	2.2436	27.955	32.464	1.0448	31.419	139.48	390.00
2.2436	2.2370	30.358	34.838	1.0610	33.777	139.54	400.00
2.2370	2.2440	32.701	37.182	1.0768	36.105	139.60	410.00
2.2440	2.2474	35.013	39.504	1.0920	38.412	139.66	420.00
2.2474	2.8471	37.305	42.400	1.1069	41.293	139.72	430.00
2.8471	3.7928	40.168	46.808	1.1252	45.683	139.79	440.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
3.7928	4.3398	44.530	52.663	1.1526	51.510	139.90	450.00
4.3398	5.5086	50.324	60.172	1.1862	58.986	140.04	460.00
5.5086	7.0369	57.762	70.308	1.2239	69.084	140.20	470.00
7.0369	7.9294	67.811	82.777	1.2730	81.504	140.42	480.00
7.9294	7.3040	80.173	95.407	1.3309	94.076	140.69	490.00
7.3040	5.8151	92.689	105.81	1.3870	104.42	140.96	500.00
5.8151	4.9882	102.99	113.80	1.4270	112.37	141.16	510.00
4.9882	4.4319	110.91	120.33	1.4561	118.88	141.31	520.00
4.4319	4.0321	117.40	125.86	1.4795	124.38	141.43	530.00
4.0321	3.8122	122.88	130.73	1.4991	129.23	141.53	540.00
3.8122	3.4466	127.71	134.97	1.5161	133.46	141.62	550.00
3.4466	2.9985	131.92	138.37	1.5307	136.84	141.70	560.00
2.9985	2.7496	135.30	141.04	1.5424	139.50	141.76	570.00
2.7496	2.6178	137.95	143.32	1.5515	141.77	141.81	580.00
2.6178	2.5397	140.21	145.37	1.5592	143.81	141.86	590.00
2.5397	2.4974	142.24	147.28	1.5661	145.71	141.90	600.00
2.4974	2.4279	144.14	149.06	1.5725	147.49	141.93	610.00
2.4279	2.3430	145.91	150.68	1.5784	149.11	141.96	620.00
2.3430	2.2966	147.52	152.16	1.5839	150.58	141.99	630.00
2.2966	2.2658	150.58	155.14	0.0000	155.14	0.00	640.00
2.2658	2.2555	155.14	159.66	0.0000	159.66	0.00	650.00
2.2555	2.2507	159.66	164.17	0.0000	164.17	0.00	660.00
2.2507	2.1480	164.17	168.57	0.0000	168.57	0.00	670.00
2.1480	1.9905	168.57	172.70	0.0000	172.70	0.00	680.00
1.9905	1.9030	172.70	176.60	0.0000	176.60	0.00	690.00
1.9030	1.8606	176.60	180.36	0.0000	180.36	0.00	700.00
1.8606	1.8315	180.36	184.05	0.0000	184.05	0.00	710.00
1.8315	1.8159	184.05	187.70	0.0000	187.70	0.00	720.00
1.8159	1.8136	187.70	191.33	0.0000	191.33	0.00	730.00
1.8136	1.8069	191.33	194.95	0.0000	194.95	0.00	740.00
1.8069	1.8037	194.95	198.56	0.0000	198.56	0.00	750.00
1.8037	1.8084	198.56	202.17	0.0000	202.17	0.00	760.00
1.8084	1.8056	202.17	205.79	0.0000	205.79	0.00	770.00
1.8056	1.8045	205.79	209.40	0.0000	209.40	0.00	780.00
1.8045	1.7086	209.40	212.91	0.0000	212.91	0.00	790.00
1.7086	1.5536	212.91	216.17	0.0000	216.17	0.00	800.00
1.5536	1.4672	216.17	219.19	0.0000	219.19	0.00	810.00
1.4672	1.4192	219.19	222.08	0.0000	222.08	0.00	820.00
1.4192	1.3927	222.08	224.89	0.0000	224.89	0.00	830.00
1.3927	1.3781	224.89	227.66	0.0000	227.66	0.00	840.00
1.3781	1.4182	227.66	230.46	0.0000	230.46	0.00	850.00
1.4182	1.4949	230.46	233.37	0.0000	233.37	0.00	860.00
1.4949	1.5382	233.37	236.40	0.0000	236.40	0.00	870.00
1.5382	1.5567	236.40	239.50	0.0000	239.50	0.00	880.00
1.5567	1.5733	239.50	242.63	0.0000	242.63	0.00	890.00
1.5733	1.5830	242.63	245.79	0.0000	245.79	0.00	900.00
1.5830	1.5827	245.79	248.95	0.0000	248.95	0.00	910.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.5827	1.5888	248.95	252.12	0.0000	252.12	0.00	920.00
1.5888	1.5926	252.12	255.30	0.0000	255.30	0.00	930.00
1.5926	1.5890	255.30	258.49	0.0000	258.49	0.00	940.00
1.5890	1.5933	258.49	261.67	0.0000	261.67	0.00	950.00
1.5933	1.5960	261.67	264.86	0.0000	264.86	0.00	960.00
1.5960	1.4409	264.86	267.89	0.0000	267.89	0.00	970.00
1.4409	1.2096	267.89	270.55	0.0000	270.55	0.00	980.00
1.2096	1.0804	270.55	272.84	0.0000	272.84	0.00	990.00
1.0804	1.0023	272.84	274.92	0.0000	274.92	0.00	1000.00
1.0023	0.9647	274.92	276.88	0.0000	276.88	0.00	1010.00
0.9647	0.9438	276.88	278.79	0.0000	278.79	0.00	1020.00
0.9438	1.0289	278.79	280.77	0.0000	280.77	0.00	1030.00
1.0289	1.1794	280.77	282.97	0.0000	282.97	0.00	1040.00
1.1794	1.2636	282.97	285.42	0.0000	285.42	0.00	1050.00
1.2636	1.3110	285.42	287.99	0.0000	287.99	0.00	1060.00
1.3110	1.3376	287.99	290.64	0.0000	290.64	0.00	1070.00
1.3376	1.3527	290.64	293.33	0.0000	293.33	0.00	1080.00
1.3527	1.3129	293.33	296.00	0.0000	296.00	0.00	1090.00
1.3129	1.2363	296.00	298.55	0.0000	298.55	0.00	1100.00
1.2363	1.1936	298.55	300.98	0.0000	300.98	0.00	1110.00
1.1936	1.3577	300.98	303.53	0.0000	303.53	0.00	1120.00
1.3577	1.2617	303.53	306.15	0.0000	306.15	0.00	1130.00
1.2617	1.0264	306.15	308.43	0.0000	308.43	0.00	1140.00
1.0264	1.0829	308.43	310.54	0.0000	310.54	0.00	1150.00
1.0829	1.1085	310.54	312.74	0.0000	312.74	0.00	1160.00
1.1085	1.1230	312.74	314.97	0.0000	314.97	0.00	1170.00
1.1230	1.1372	314.97	317.23	0.0000	317.23	0.00	1180.00
1.1372	1.1392	317.23	319.50	0.0000	319.50	0.00	1190.00
1.1392	1.1405	319.50	321.78	0.0000	321.78	0.00	1200.00
1.1405	1.1474	321.78	324.07	0.0000	324.07	0.00	1210.00
1.1474	1.1453	324.07	326.36	0.0000	326.36	0.00	1220.00
1.1453	1.1442	326.36	328.65	0.0000	328.65	0.00	1230.00
1.1442	1.1498	328.65	330.95	0.0000	330.95	0.00	1240.00
1.1498	1.1470	330.95	333.24	0.0000	333.24	0.00	1250.00
1.1470	1.1455	333.24	335.54	0.0000	335.54	0.00	1260.00
1.1455	1.1509	335.54	337.83	0.0000	337.83	0.00	1270.00
1.1509	1.1479	337.83	340.13	0.0000	340.13	0.00	1280.00
1.1479	1.1464	340.13	342.43	0.0000	342.43	0.00	1290.00
1.1464	1.1517	342.43	344.72	0.0000	344.72	0.00	1300.00
1.1517	1.1487	344.72	347.02	0.0000	347.02	0.00	1310.00
1.1487	1.1472	347.02	349.32	0.0000	349.32	0.00	1320.00
1.1472	1.0977	349.32	351.57	0.0000	351.57	0.00	1330.00
1.0977	1.0214	351.57	353.68	0.0000	353.68	0.00	1340.00
1.0214	0.9789	353.68	355.69	0.0000	355.69	0.00	1350.00
0.9789	0.9491	355.69	357.61	0.0000	357.61	0.00	1360.00
0.9491	0.9386	357.61	359.50	0.0000	359.50	0.00	1370.00
0.9386	0.9327	359.50	361.37	0.0000	361.37	0.00	1380.00

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.9327	0.9235	361.37	363.23	0.0000	363.23	0.00	1390.00
0.9235	0.9245	363.23	365.08	0.0000	365.08	0.00	1400.00
0.9245	0.9251	365.08	366.93	0.0000	366.93	0.00	1410.00
0.9251	0.9194	366.93	368.77	0.0000	368.77	0.00	1420.00
0.9194	0.9224	368.77	370.61	0.0000	370.61	0.00	1430.00
0.9224	0.9241	370.61	372.46	0.0000	372.46	0.00	1440.00
0.9241	0.7177	372.46	374.10	0.0000	374.10	0.00	1450.00
0.7177	0.4011	374.10	375.22	0.0000	375.22	0.00	1460.00
0.4011	0.2242	375.22	375.84	0.0000	375.84	0.00	1470.00
0.2242	0.1253	375.84	376.19	0.0000	376.19	0.00	1480.00
0.1253	0.0700	376.19	376.39	0.0000	376.39	0.00	1490.00
0.0700	0.0391	376.39	376.50	0.0000	376.50	0.00	1500.00

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ROUTING REPORT

STORAGE LIST ID No. A
Description:MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 137.55
Elev: 137.55 ft Orifice Diameter: 5.2617 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
137.55	0.0000	0.0000	0.0000	139.10	3837	0.9354	13.725	140.70	24218	1.3334	82.059
137.60	0.0000	0.1680	0.1680	139.20	5022	0.9651	17.704	140.80	25606	1.3544	86.707
137.70	0.0000	0.2910	0.2910	139.30	6207	0.9939	21.683	140.90	26994	1.3751	91.355
137.80	0.0000	0.3757	0.3757	139.40	7392	1.0219	25.661	141.00	28382	1.3955	96.002
137.90	0.0000	0.4445	0.4445	139.50	8577	1.0491	29.637	141.10	29979	1.4156	101.34
138.00	0.0000	0.5040	0.5040	139.60	9761	1.0757	33.614	141.20	31575	1.4354	106.69
138.10	0.0000	0.5572	0.5572	139.70	10946	1.1016	37.589	141.30	33172	1.4549	112.03
138.20	0.0000	0.6057	0.6057	139.80	12131	1.1270	41.564	141.40	34768	1.4742	117.37
138.30	0.0000	0.6507	0.6507	139.90	13316	1.1517	45.539	141.50	36365	1.4932	122.71
138.40	0.0000	0.6927	0.6927	140.00	14501	1.1760	49.513	141.60	37962	1.5120	128.05
138.50	0.0000	0.7323	0.7323	140.10	15889	1.1997	54.163	141.70	39558	1.5305	133.39
138.60	0.0000	0.7699	0.7699	140.20	17277	1.2230	58.814	141.80	41155	1.5489	138.73
138.70	0.0000	0.8057	0.8057	140.30	18665	1.2459	63.464	141.90	42751	1.5670	144.07
138.80	530.40	0.8400	2.6080	140.40	20053	1.2684	68.113				
138.90	1591	0.8729	6.1769	140.50	21442	1.2904	72.762				
139.00	2652	0.9047	9.7447	140.60	22830	1.3121	77.411				

NOVELLUS

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MATCH Q (cfs) : 3.71 INFLOW Q (cfs): 9.08
 PEAK STAGE (ft): 141.92 PEAK OUTFLOW : 1.57
 PEAK TIME: 530.00 min.
 INFLOW HYD No. : 7 OUTFLOW HYD No.: 12

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0088	0.0000	0.0088	0.0000	0.0088	137.55	40.00
0.0088	0.0452	0.0000	0.0540	0.0088	0.0452	137.55	50.00
0.0452	0.1056	0.0000	0.1508	0.0452	0.1056	137.55	60.00
0.1056	0.2104	-0.0000	0.3160	0.1056	0.2104	137.55	70.00
0.2104	0.3506	0.0000	0.5611	0.2104	0.3506	137.55	80.00
0.3506	0.4795	0.0000	0.8301	0.3506	0.4795	137.55	90.00
0.4795	0.5923	0.0000	1.0718	0.4795	0.5923	137.55	100.00
0.5923	0.6890	0.0000	1.2813	0.5923	0.6890	137.55	110.00
0.6890	0.7709	0.0000	1.4598	0.6890	0.7709	137.55	120.00
0.7709	0.8746	0.0000	1.6455	0.7709	0.8746	137.55	130.00
0.8746	0.9944	0.0676	1.9367	0.8070	1.1297	138.70	140.00
0.9944	1.0837	0.3178	2.3959	0.8119	1.5841	138.72	150.00
1.0837	1.1479	0.7636	2.9952	0.8205	2.1747	138.74	160.00
1.1479	1.2047	1.3430	3.6956	0.8317	2.8638	138.78	170.00
1.2047	1.2502	2.0215	4.4763	0.8423	3.6340	138.81	180.00
1.2502	1.2826	2.7845	5.3172	0.8495	4.4678	138.83	190.00
1.2826	1.3162	3.6106	6.2093	0.8572	5.3522	138.85	200.00
1.3162	1.3440	4.4868	7.1470	0.8653	6.2817	138.88	210.00
1.3440	1.3624	5.4078	8.1142	0.8739	7.2404	138.90	220.00
1.3624	1.3851	6.3580	9.1054	0.8824	8.2230	138.93	230.00
1.3851	1.4041	7.3319	10.121	0.8912	9.2299	138.96	240.00
1.4041	1.4642	8.3298	11.198	0.9001	10.298	138.99	250.00
1.4642	1.5479	9.3890	12.401	0.9090	11.492	139.01	260.00
1.5479	1.6023	10.574	13.724	0.9182	12.806	139.04	270.00
1.6023	1.6463	11.878	15.126	0.9283	14.198	139.08	280.00
1.6463	1.6727	13.259	16.578	0.9389	15.639	139.11	290.00
1.6727	1.6944	14.690	18.057	0.9497	17.107	139.15	300.00
1.6944	1.9105	16.147	19.751	0.9606	18.791	139.18	310.00
1.9105	2.2325	17.818	21.961	0.9729	20.988	139.23	320.00
2.2325	2.4245	19.999	24.656	0.9889	23.667	139.28	330.00
2.4245	2.5427	22.659	27.626	1.0079	26.619	139.35	340.00
2.5427	2.6187	25.590	30.751	1.0285	29.723	139.42	350.00
2.6187	2.6704	28.673	33.962	1.0497	32.913	139.50	360.00
2.6704	2.6589	31.842	37.171	1.0710	36.100	139.58	370.00
2.6589	2.6109	35.008	40.278	1.0919	39.186	139.66	380.00
2.6109	2.5841	38.074	43.269	1.1118	42.157	139.74	390.00
2.5841	2.5751	41.027	46.186	1.1307	45.055	139.81	400.00
2.5751	2.5817	43.907	49.063	1.1487	47.915	139.89	410.00
2.5817	2.5844	46.748	51.914	1.1662	50.748	139.96	420.00
2.5844	3.2716	49.566	55.422	1.1823	54.240	140.03	430.00
3.2716	4.3554	53.039	60.667	1.2001	59.466	140.10	440.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
4.3554	4.9805	58.240	67.576	1.2262	66.350	140.21	450.00
4.9805	6.3168	65.090	76.387	1.2598	75.128	140.36	460.00
6.3168	8.0629	73.826	88.206	1.3014	86.904	140.55	470.00
8.0629	9.0790	85.549	102.69	1.3553	101.34	140.80	480.00
9.0790	8.3587	99.920	117.36	1.4155	115.94	141.10	490.00
8.3587	6.6523	114.47	129.48	1.4690	128.02	141.37	500.00
6.6523	5.7040	126.50	138.86	1.5119	137.35	141.60	510.00
5.7040	5.0661	135.80	146.57	1.5441	145.03	141.77	520.00
5.0661	4.6075	143.46	153.13	1.5702	151.56	141.92	530.00
4.6075	4.3549	151.56	160.53	0.0000	160.53	0.00	540.00
4.3549	3.9363	160.53	168.82	0.0000	168.82	0.00	550.00
3.9363	3.4238	168.82	176.18	0.0000	176.18	0.00	560.00
3.4238	3.1390	176.18	182.74	0.0000	182.74	0.00	570.00
3.1390	2.9880	182.74	188.87	0.0000	188.87	0.00	580.00
2.9880	2.8984	188.87	194.75	0.0000	194.75	0.00	590.00
2.8984	2.8497	194.75	200.50	0.0000	200.50	0.00	600.00
2.8497	2.7700	200.50	206.12	0.0000	206.12	0.00	610.00
2.7700	2.6728	206.12	211.56	0.0000	211.56	0.00	620.00
2.6728	2.6196	211.56	216.86	0.0000	216.86	0.00	630.00
2.6196	2.5842	216.86	222.06	0.0000	222.06	0.00	640.00
2.5842	2.5722	222.06	227.22	0.0000	227.22	0.00	650.00
2.5722	2.5664	227.22	232.35	0.0000	232.35	0.00	660.00
2.5664	2.4491	232.35	237.37	0.0000	237.37	0.00	670.00
2.4491	2.2693	237.37	242.09	0.0000	242.09	0.00	680.00
2.2693	2.1693	242.09	246.53	0.0000	246.53	0.00	690.00
2.1693	2.1209	246.53	250.82	0.0000	250.82	0.00	700.00
2.1209	2.0876	250.82	255.03	0.0000	255.03	0.00	710.00
2.0876	2.0695	255.03	259.18	0.0000	259.18	0.00	720.00
2.0695	2.0668	259.18	263.32	0.0000	263.32	0.00	730.00
2.0668	2.0590	263.32	267.45	0.0000	267.45	0.00	740.00
2.0590	2.0552	267.45	271.56	0.0000	271.56	0.00	750.00
2.0552	2.0604	271.56	275.68	0.0000	275.68	0.00	760.00
2.0604	2.0571	275.68	279.79	0.0000	279.79	0.00	770.00
2.0571	2.0557	279.79	283.91	0.0000	283.91	0.00	780.00
2.0557	1.9463	283.91	287.91	0.0000	287.91	0.00	790.00
1.9463	1.7696	287.91	291.62	0.0000	291.62	0.00	800.00
1.7696	1.6712	291.62	295.06	0.0000	295.06	0.00	810.00
1.6712	1.6164	295.06	298.35	0.0000	298.35	0.00	820.00
1.6164	1.5861	298.35	301.55	0.0000	301.55	0.00	830.00
1.5861	1.5694	301.55	304.71	0.0000	304.71	0.00	840.00
1.5694	1.6150	304.71	307.89	0.0000	307.89	0.00	850.00
1.6150	1.7023	307.89	311.21	0.0000	311.21	0.00	860.00
1.7023	1.7514	311.21	314.66	0.0000	314.66	0.00	870.00
1.7514	1.7724	314.66	318.19	0.0000	318.19	0.00	880.00
1.7724	1.7913	318.19	321.75	0.0000	321.75	0.00	890.00
1.7913	1.8022	321.75	325.35	0.0000	325.35	0.00	900.00
1.8022	1.8018	325.35	328.95	0.0000	328.95	0.00	910.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.8018	1.8087	328.95	332.56	0.0000	332.56	0.00	920.00
1.8087	1.8129	332.56	336.18	0.0000	336.18	0.00	930.00
1.8129	1.8087	336.18	339.80	0.0000	339.80	0.00	940.00
1.8087	1.8135	339.80	343.43	0.0000	343.43	0.00	950.00
1.8135	1.8165	343.43	347.06	0.0000	347.06	0.00	960.00
1.8165	1.6399	347.06	350.51	0.0000	350.51	0.00	970.00
1.6399	1.3766	350.51	353.53	0.0000	353.53	0.00	980.00
1.3766	1.2295	353.53	356.13	0.0000	356.13	0.00	990.00
1.2295	1.1406	356.13	358.50	0.0000	358.50	0.00	1000.00
1.1406	1.0978	358.50	360.74	0.0000	360.74	0.00	1010.00
1.0978	1.0740	360.74	362.91	0.0000	362.91	0.00	1020.00
1.0740	1.1708	362.91	365.16	0.0000	365.16	0.00	1030.00
1.1708	1.3419	365.16	367.67	0.0000	367.67	0.00	1040.00
1.3419	1.4378	367.67	370.45	0.0000	370.45	0.00	1050.00
1.4378	1.4915	370.45	373.38	0.0000	373.38	0.00	1060.00
1.4915	1.5218	373.38	376.39	0.0000	376.39	0.00	1070.00
1.5218	1.5389	376.39	379.46	0.0000	379.46	0.00	1080.00
1.5389	1.4935	379.46	382.49	0.0000	382.49	0.00	1090.00
1.4935	1.4064	382.49	385.39	0.0000	385.39	0.00	1100.00
1.4064	1.3578	385.39	388.15	0.0000	388.15	0.00	1110.00
1.3578	1.5444	388.15	391.05	0.0000	391.05	0.00	1120.00
1.5444	1.4352	391.05	394.03	0.0000	394.03	0.00	1130.00
1.4352	1.1675	394.03	396.64	0.0000	396.64	0.00	1140.00
1.1675	1.2317	396.64	399.04	0.0000	399.04	0.00	1150.00
1.2317	1.2608	399.04	401.53	0.0000	401.53	0.00	1160.00
1.2608	1.2772	401.53	404.07	0.0000	404.07	0.00	1170.00
1.2772	1.2934	404.07	406.64	0.0000	406.64	0.00	1180.00
1.2934	1.2956	406.64	409.23	0.0000	409.23	0.00	1190.00
1.2956	1.2970	409.23	411.82	0.0000	411.82	0.00	1200.00
1.2970	1.3048	411.82	414.42	0.0000	414.42	0.00	1210.00
1.3048	1.3024	414.42	417.03	0.0000	417.03	0.00	1220.00
1.3024	1.3012	417.03	419.63	0.0000	419.63	0.00	1230.00
1.3012	1.3075	419.63	422.24	0.0000	422.24	0.00	1240.00
1.3075	1.3042	422.24	424.85	0.0000	424.85	0.00	1250.00
1.3042	1.3025	424.85	427.46	0.0000	427.46	0.00	1260.00
1.3025	1.3086	427.46	430.07	0.0000	430.07	0.00	1270.00
1.3086	1.3052	430.07	432.68	0.0000	432.68	0.00	1280.00
1.3052	1.3034	432.68	435.29	0.0000	435.29	0.00	1290.00
1.3034	1.3094	435.29	437.90	0.0000	437.90	0.00	1300.00
1.3094	1.3060	437.90	440.52	0.0000	440.52	0.00	1310.00
1.3060	1.3042	440.52	443.13	0.0000	443.13	0.00	1320.00
1.3042	1.2479	443.13	445.68	0.0000	445.68	0.00	1330.00
1.2479	1.1612	445.68	448.09	0.0000	448.09	0.00	1340.00
1.1612	1.1128	448.09	450.37	0.0000	450.37	0.00	1350.00
1.1128	1.0789	450.37	452.56	0.0000	452.56	0.00	1360.00
1.0789	1.0669	452.56	454.70	0.0000	454.70	0.00	1370.00
1.0669	1.0603	454.70	456.83	0.0000	456.83	0.00	1380.00

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
1.0603	1.0497	456.83	458.94	0.0000	458.94	0.00	1390.00
1.0497	1.0508	458.94	461.04	0.0000	461.04	0.00	1400.00
1.0508	1.0515	461.04	463.14	0.0000	463.14	0.00	1410.00
1.0515	1.0450	463.14	465.24	0.0000	465.24	0.00	1420.00
1.0450	1.0484	465.24	467.33	0.0000	467.33	0.00	1430.00
1.0484	1.0503	467.33	469.43	0.0000	469.43	0.00	1440.00
1.0503	0.8158	469.43	471.30	0.0000	471.30	0.00	1450.00
0.8158	0.4559	471.30	472.57	0.0000	472.57	0.00	1460.00
0.4559	0.2548	472.57	473.28	0.0000	473.28	0.00	1470.00
0.2548	0.1424	473.28	473.68	0.0000	473.68	0.00	1480.00
0.1424	0.0796	473.68	473.90	0.0000	473.90	0.00	1490.00
0.0796	0.0445	473.90	474.02	0.0000	474.02	0.00	1500.00

'N' - POND 'B' TOTAL VOLUME

ELEV (FT)	AREA (SF)	VOL (CF)	CUMM VOL (CCF)
135	7015		
136	8904	7960	7960
137	10,849	9877	17,836 ← WQ VOL @ 136.75'
138	12,851	11,550	29,686
139	14,909	15,966	45,652
140	17,023	15,966	61,618

WQ RELEASE RATE

$$\frac{15,249 \text{ ft}^3}{48 \text{ HRS}} \times \frac{1 \text{ HR}}{3600 \text{ s}} = 0.088 \text{ cfs}$$

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

By _____

Date _____

Job # _____

Sht. _____ of _____

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0' - POND 'B' DETENTION VOLUME

ELEV (FT)	AREA (SF)	VOL (CF)	CUMM. VOL. (CF)
136.75	10,363		
137	10,849	2652	2652
138	12,851	11,850	14,502
139	14,909	13,880	28,382
140	17,023	15,452	43,834

GROUP

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0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
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By _____

Date _____

Job # _____

Sht. _____ of _____

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'P' WQ ORIFICE 'B'

$$Q = CA (2gh)^{1/2}$$

$$A = \frac{Q}{C (2gh)^{1/2}}$$

$$A = \frac{0.088 \text{ cfs}}{0.62 (2 \times 32.2 \times 0.5)^{1/2}}$$

$$A = 0.025 \text{ ft}^2$$

$$d = \sqrt{\frac{4A}{\pi}} = 0.178' = \underline{\underline{2.14'' \phi}}$$

$$Q = 0.088 \text{ cfs}$$

$$C = 0.6$$

$$h = 136.75 - 136.25 = 0.5'$$

$$g = 32.2$$

$$A = \frac{\pi d^2}{4}$$

$$d = \sqrt{\frac{4A}{\pi}}$$

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

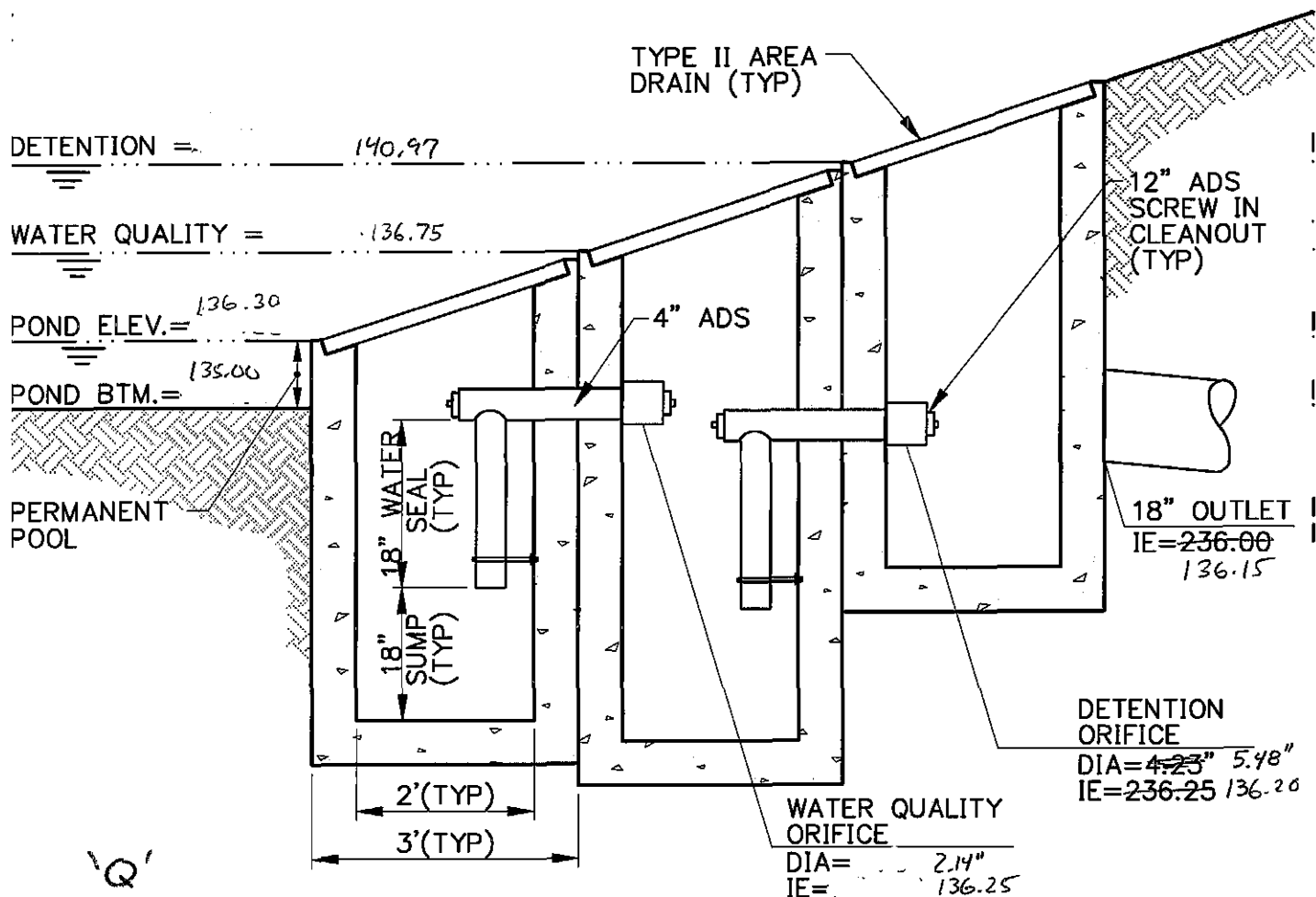
By _____

Date _____

Job # _____

Sht. _____ of _____

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2
C8.1

POND "B" OUTLET DETAIL

N.T.S.
OUTFLOW DEVICE

SD150
DETINSET= 1:1

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BASIN SUMMARY

```

BASIN ID: D10                NAME: DEVELOPED 10YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres      BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A         PERVIOUS AREA
PRECIPITATION.....: 3.45 inches     AREA...: 2.06 Acres
TIME INTERVAL.....: 10.00 min       CN....: 80.00
TIME OF CONC.....: 14.80 min        IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20             AREA...: 11.66 Acres
                                      CN....: 98.00

TcReach - Sheet    L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet    L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel  L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 8.23 cfs VOL: 3.40 Ac-ft TIME: 480 min

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BASIN ID: D2                NAME: DEVELOPED 2YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres      BASEFLOWS: 0.00 cfs
RAINFALL TYPE....: TYPE1A          PERVIOUS AREA
PRECIPITATION....: 2.50 inches      AREA...: 2.06 Acres
TIME INTERVAL....: 10.00 min         CN....: 80.00
TIME OF CONC.....: 14.80 min        IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20             AREA...: 11.66 Acres
                                      CN....: 98.00

TcReach - Sheet    L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet    L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel  L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 5.73 cfs VOL: 2.36 Ac-ft TIME: 480 min

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BASIN ID: D25                NAME: DEVELOPED 25YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres      BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A         PERVIOUS AREA
PRECIPITATION.....: 3.90 inches     AREA...: 2.06 Acres
TIME INTERVAL.....: 10.00 min       CN.....: 80.00
TIME OF CONC.....: 14.80 min        IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20             AREA...: 11.66 Acres
                                      CN.....: 98.00

TcReach - Sheet    L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet    L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel  L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 9.42 cfs VOL: 3.90 Ac-ft TIME: 480 min

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BASIN SUMMARY

BASIN ID: E10 NAME: EXISTING 10YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.45 inches AREA...: 13.72 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN.....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 2.90 cfs VOL: 1.83 Ac-ft TIME: 490 min

BASIN ID: E2 NAME: EXISTING 2YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 2.50 inches AREA...: 13.72 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN.....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 1.36 cfs VOL: 1.02 Ac-ft TIME: 490 min

BASIN ID: E25 NAME: EXISTING 25YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 13.72 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.90 inches AREA...: 13.72 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN.....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 3.71 cfs VOL: 2.24 Ac-ft TIME: 490 min

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HYDROGRAPH SUMMARY

HYD NUM	PEAK RUNOFF RATE cfs	TIME OF PEAK min.	VOLUME OF HYDRO cf\AcFt	Contrib Area Acres
1	1.356	490	44270 cf	13.72
2	2.902	490	79526 cf	13.72
3	3.714	490	97581 cf	13.72
5	5.734	480	102758 cf	13.72
6	8.230	480	148087 cf	13.72
7	9.422	480	169790 cf	13.72
10	1.356	690	102847 cf	13.72
11	1.670	800	148142 cf	13.72
12	1.779	660	39111 cf	13.72

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ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 136.20
Elev: 136.20 ft Orifice Diameter: 5.4785 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
136.20	0.0000	0.0000	0.0000	137.90	13317	1.0620	45.452	139.60	37653	1.5019	127.01
136.30	0.0000	0.2576	0.2576	138.00	14502	1.0928	49.433	139.70	39198	1.5238	132.19
136.40	0.0000	0.3643	0.3643	138.10	15890	1.1227	54.089	139.80	40744	1.5454	137.36
136.50	0.0000	0.4461	0.4461	138.20	17278	1.1519	58.745	139.90	42289	1.5667	142.53
136.60	0.0000	0.5151	0.5151	138.30	18666	1.1803	63.400	140.00	43834	1.5877	147.70
136.70	0.0000	0.5759	0.5759	138.40	20054	1.2081	68.055	140.10	45251	1.6085	152.44
136.80	530.40	0.6309	2.3989	138.50	21442	1.2352	72.709	140.20	46667	1.6290	157.19
136.90	1591	0.6815	5.9855	138.60	22830	1.2618	77.362	140.30	48084	1.6492	161.93
137.00	2652	0.7285	9.5685	138.70	24218	1.2878	82.014	140.40	49500	1.6692	166.67
137.10	3837	0.7727	13.563	138.80	25606	1.3133	86.667	140.50	50917	1.6890	171.41
137.20	5022	0.8145	17.554	138.90	26994	1.3384	91.318	140.60	52334	1.7085	176.15
137.30	6207	0.8542	21.544	139.00	28382	1.3629	95.970	140.70	53750	1.7278	180.90
137.40	7392	0.8922	25.532	139.10	29927	1.3870	101.14	140.80	55167	1.7469	185.64
137.50	8577	0.9287	29.519	139.20	31472	1.4107	106.32	140.90	56583	1.7658	190.38
137.60	9762	0.9637	33.504	139.30	33018	1.4341	111.49				
137.70	10947	0.9975	37.488	139.40	34563	1.4570	116.67				
137.80	12132	1.0303	41.470	139.50	36108	1.4796	121.84				

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 1.36 INFLOW Q (cfs): 5.73
 PEAK STAGE (ft): 138.97 PEAK OUTFLOW : 1.36
 PEAK TIME: 690.00 min.
 INFLOW HYD No. : 5 OUTFLOW HYD No.: 10

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	136.20	50.00
0.0001	0.0071	0.0000	0.0072	0.0001	0.0071	136.20	60.00
0.0071	0.0405	0.0000	0.0476	0.0071	0.0405	136.20	70.00
0.0405	0.1004	0.0000	0.1409	0.0405	0.1004	136.20	80.00
0.1004	0.1674	0.0000	0.2677	0.1004	0.1674	136.20	90.00
0.1674	0.2325	0.0000	0.3999	0.1674	0.2325	136.20	100.00
0.2325	0.2922	0.0000	0.5246	0.2325	0.2922	136.20	110.00
0.2922	0.3455	0.0000	0.6377	0.2922	0.3455	136.20	120.00
0.3455	0.4121	0.0000	0.7576	0.3455	0.4121	136.20	130.00
0.4121	0.4879	0.0000	0.8999	0.4121	0.4879	136.20	140.00
0.4879	0.5466	0.0000	1.0345	0.4879	0.5466	136.20	150.00
0.5466	0.5916	0.0000	1.1382	0.5466	0.5916	136.20	160.00
0.5916	0.6329	0.0152	1.2397	0.5764	0.6633	136.70	170.00
0.6329	0.6676	0.0847	1.3853	0.5786	0.8067	136.70	180.00
0.6676	0.6944	0.2238	1.5859	0.5829	1.0030	136.71	190.00
0.6944	0.7222	0.4142	1.8308	0.5888	1.2420	136.72	200.00
0.7222	0.7459	0.6460	2.1141	0.5960	1.5181	136.74	210.00
0.7459	0.7634	0.9137	2.4231	0.6043	1.8187	136.75	220.00
0.7634	0.7836	1.2053	2.7523	0.6134	2.1389	136.77	230.00
0.7836	0.8010	1.5159	3.1005	0.6231	2.4774	136.79	240.00
0.8010	0.8455	1.8454	3.4918	0.6320	2.8598	136.80	250.00
0.8455	0.9035	2.2224	3.9714	0.6374	3.3340	136.81	260.00
0.9035	0.9394	2.6899	4.5328	0.6441	3.8888	136.83	270.00
0.9394	0.9673	3.2369	5.1435	0.6519	4.4916	136.84	280.00
0.9673	0.9831	3.8312	5.7815	0.6604	5.1211	136.86	290.00
0.9831	0.9963	4.4519	6.4312	0.6693	5.7620	136.88	300.00
0.9963	1.1404	5.0837	7.2204	0.6783	6.5421	136.89	310.00
1.1404	1.3477	5.8533	8.3415	0.6888	7.6527	136.92	320.00
1.3477	1.4589	6.9494	9.7560	0.7033	9.0527	136.95	330.00
1.4589	1.5216	8.3309	11.311	0.7217	10.590	136.99	340.00
1.5216	1.5601	9.8499	12.932	0.7398	12.192	137.03	350.00
1.5601	1.5875	11.434	14.582	0.7575	13.824	137.07	360.00
1.5875	1.5763	13.049	16.213	0.7754	15.437	137.11	370.00
1.5763	1.5447	14.645	17.766	0.7923	16.974	137.15	380.00
1.5447	1.5310	16.165	19.241	0.8084	18.433	137.19	390.00
1.5310	1.5300	17.609	20.670	0.8232	19.847	137.22	400.00
1.5300	1.5391	19.010	22.079	0.8373	21.241	137.26	410.00
1.5391	1.5444	20.390	23.474	0.8512	22.623	137.29	420.00
1.5444	2.0207	21.758	25.323	0.8645	24.459	137.33	430.00
2.0207	2.7418	23.577	28.339	0.8820	27.457	137.37	440.00
2.7418	3.1175	26.547	32.407	0.9098	31.497	137.45	450.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
3.1175	3.9947	30.551	37.663	0.9461	36.717	137.55	460.00
3.9947	5.1321	35.726	44.853	0.9910	43.862	137.68	470.00
5.1321	5.7341	42.812	53.679	1.0493	52.629	137.86	480.00
5.7341	5.1376	51.516	62.388	1.1133	61.274	138.07	490.00
5.1376	3.9324	60.107	69.177	1.1673	68.010	138.25	500.00
3.9324	3.3411	66.802	74.075	1.2078	72.867	138.40	510.00
3.3411	2.9739	71.631	77.946	1.2361	76.710	138.50	520.00
2.9739	2.7215	75.452	81.147	1.2581	79.889	138.59	530.00
2.7215	2.6003	78.613	83.935	1.2759	82.659	138.65	540.00
2.6003	2.3457	81.368	86.314	1.2914	85.022	138.71	550.00
2.3457	2.0240	83.718	88.088	1.3043	86.783	138.76	560.00
2.0240	1.8663	85.469	89.360	1.3140	88.046	138.80	570.00
1.8663	1.7945	86.725	90.386	1.3207	89.065	138.83	580.00
1.7945	1.7557	87.739	91.289	1.3262	89.963	138.85	590.00
1.7557	1.7379	88.632	92.125	1.3311	90.794	138.87	600.00
1.7379	1.6924	89.459	92.889	1.3355	91.554	138.89	610.00
1.6924	1.6330	90.214	93.539	1.3396	92.200	138.91	620.00
1.6330	1.6047	90.857	94.095	1.3430	92.752	138.92	630.00
1.6047	1.5870	91.406	94.597	1.3459	93.251	138.93	640.00
1.5870	1.5841	91.903	95.074	1.3486	93.725	138.94	650.00
1.5841	1.5836	92.374	95.542	1.3511	94.191	138.95	660.00
1.5836	1.5029	92.838	95.924	1.3535	94.571	138.96	670.00
1.5029	1.3821	93.215	96.100	1.3555	94.744	138.97	680.00
1.3821	1.3230	93.388	96.093	1.3564	94.737	138.97	690.00
1.3230	1.2991	93.380	96.002	1.3564	94.646	138.97	700.00
1.2991	1.2830	93.290	95.872	1.3559	94.516	138.97	710.00
1.2830	1.2757	93.161	95.720	1.3552	94.364	138.97	720.00
1.2757	1.2775	93.010	95.563	1.3544	94.209	138.97	730.00
1.2775	1.2741	92.855	95.407	1.3536	94.053	138.96	740.00
1.2741	1.2730	92.700	95.247	1.3528	93.894	138.96	750.00
1.2730	1.2778	92.543	95.093	1.3520	93.741	138.96	760.00
1.2778	1.2759	92.390	94.944	1.3511	93.593	138.95	770.00
1.2759	1.2755	92.242	94.794	1.3504	93.443	138.95	780.00
1.2755	1.1982	92.094	94.567	1.3496	93.218	138.95	790.00
1.1982	1.0780	91.869	94.146	1.3484	92.797	138.94	800.00
1.0780	1.0187	91.451	93.548	1.3462	92.202	138.93	810.00
1.0187	0.9897	90.859	92.867	1.3430	91.524	138.92	820.00
0.9897	0.9756	90.185	92.150	1.3394	90.810	138.90	830.00
0.9756	0.9689	89.475	91.419	1.3356	90.083	138.89	840.00
0.9689	1.0047	88.752	90.725	1.3317	89.394	138.87	850.00
1.0047	1.0666	88.066	90.137	1.3280	88.809	138.86	860.00
1.0666	1.0976	87.484	89.648	1.3249	88.323	138.85	870.00
1.0976	1.1084	87.001	89.207	1.3222	87.885	138.84	880.00
1.1084	1.1190	86.565	88.792	1.3199	87.473	138.83	890.00
1.1190	1.1246	86.155	88.398	1.3177	87.081	138.82	900.00
1.1246	1.1228	85.765	88.013	1.3156	86.697	138.81	910.00
1.1228	1.1272	85.384	87.634	1.3135	86.320	138.80	920.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.1272	1.1296	85.009	87.265	1.3114	85.954	138.79	930.00
1.1296	1.1263	84.645	86.901	1.3094	85.591	138.78	940.00
1.1263	1.1299	84.284	86.540	1.3074	85.232	138.78	950.00
1.1299	1.1320	83.927	86.189	1.3055	84.883	138.77	960.00
1.1320	1.0060	83.580	85.718	1.3036	84.414	138.76	970.00
1.0060	0.8262	83.113	84.945	1.3010	83.644	138.75	980.00
0.8262	0.7373	82.348	83.911	1.2968	82.614	138.74	990.00
0.7373	0.6885	81.323	82.749	1.2911	81.458	138.71	1000.00
0.6885	0.6694	80.173	81.531	1.2847	80.247	138.69	1010.00
0.6694	0.6600	78.969	80.298	1.2779	79.020	138.66	1020.00
0.6600	0.7340	77.749	79.143	1.2711	77.872	138.64	1030.00
0.7340	0.8542	76.607	78.195	1.2647	76.931	138.61	1040.00
0.8542	0.9139	75.671	77.439	1.2593	76.180	138.59	1050.00
0.9139	0.9437	74.925	76.783	1.2551	75.527	138.57	1060.00
0.9437	0.9587	74.276	76.179	1.2513	74.927	138.56	1070.00
0.9587	0.9663	73.679	75.604	1.2479	74.356	138.55	1080.00
0.9663	0.9309	73.112	75.009	1.2446	73.764	138.54	1090.00
0.9309	0.8693	72.523	74.323	1.2413	73.082	138.52	1100.00
0.8693	0.8389	71.844	73.553	1.2374	72.315	138.51	1110.00
0.8389	0.9767	71.082	72.898	1.2329	71.665	138.49	1120.00
0.9767	0.8924	70.436	72.305	1.2292	71.076	138.48	1130.00
0.8924	0.7030	69.850	71.446	1.2257	70.220	138.46	1140.00
0.7030	0.7621	68.999	70.464	1.2207	69.243	138.45	1150.00
0.7621	0.7865	68.028	69.577	1.2150	68.362	138.43	1160.00
0.7865	0.7988	67.152	68.737	1.2099	67.528	138.41	1170.00
0.7988	0.8099	66.323	67.931	1.2049	66.726	138.39	1180.00
0.8099	0.8106	65.526	67.147	1.2002	65.947	138.37	1190.00
0.8106	0.8111	64.751	66.373	1.1955	65.177	138.35	1200.00
0.8111	0.8164	63.986	65.614	1.1909	64.423	138.34	1210.00
0.8164	0.8142	63.236	64.867	1.1864	63.681	138.32	1220.00
0.8142	0.8133	62.499	64.126	1.1820	62.944	138.31	1230.00
0.8133	0.8179	61.767	63.398	1.1775	62.220	138.29	1240.00
0.8179	0.8153	61.047	62.681	1.1731	61.507	138.27	1250.00
0.8153	0.8142	60.339	61.968	1.1687	60.799	138.26	1260.00
0.8142	0.8187	59.635	61.268	1.1644	60.104	138.24	1270.00
0.8187	0.8161	58.943	60.578	1.1602	59.418	138.23	1280.00
0.8161	0.8150	58.262	59.893	1.1560	58.737	138.21	1290.00
0.8150	0.8195	57.585	59.220	1.1518	58.068	138.20	1300.00
0.8195	0.8169	56.921	58.557	1.1476	57.409	138.19	1310.00
0.8169	0.8157	56.266	57.898	1.1435	56.755	138.17	1320.00
0.8157	0.7756	55.615	57.207	1.1394	56.067	138.16	1330.00
0.7756	0.7162	54.932	56.424	1.1351	55.289	138.14	1340.00
0.7162	0.6868	54.159	55.562	1.1302	54.431	138.13	1350.00
0.6868	0.6674	53.307	54.661	1.1248	53.536	138.11	1360.00
0.6674	0.6628	52.417	53.747	1.1191	52.628	138.09	1370.00
0.6628	0.6606	51.515	52.838	1.1133	51.725	138.07	1380.00
0.6606	0.6547	50.617	51.932	1.1075	50.825	138.05	1390.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.6547	0.6567	49.723	51.035	1.1017	49.933	138.03	1400.00
0.6567	0.6578	48.837	50.152	1.0960	49.056	138.01	1410.00
0.6578	0.6535	47.966	49.277	1.0898	48.187	137.99	1420.00
0.6535	0.6564	47.104	48.414	1.0831	47.331	137.97	1430.00
0.6564	0.6579	46.254	47.569	1.0765	46.492	137.95	1440.00
0.6579	0.4897	45.422	46.570	1.0700	45.500	137.93	1450.00
0.4897	0.2424	44.437	45.169	1.0623	44.107	137.90	1460.00
0.2424	0.1200	43.056	43.418	1.0513	42.367	137.87	1470.00
0.1200	0.0594	41.330	41.509	1.0374	40.472	137.82	1480.00
0.0594	0.0294	39.450	39.538	1.0221	38.516	137.77	1490.00
0.0294	0.0146	37.510	37.554	1.0060	36.548	137.73	1500.00
0.0146	0.0072	35.559	35.581	0.9896	34.591	137.68	1510.00
0.0072	0.0036	33.618	33.629	0.9730	32.656	137.63	1520.00
0.0036	0.0018	31.700	31.705	0.9563	30.749	137.58	1530.00
0.0018	0.0009	29.809	29.812	0.9395	28.872	137.53	1540.00
0.0009	0.0004	27.950	27.951	0.9228	27.028	137.48	1550.00
0.0004	0.0002	26.122	26.123	0.9059	25.217	137.44	1560.00
0.0002	0.0001	24.328	24.328	0.8892	23.439	137.39	1570.00
0.0001	0.0001	22.566	22.567	0.8723	21.694	137.35	1580.00
0.0001	0.0000	20.839	20.839	0.8557	19.983	137.30	1590.00
0.0000	0.0000	19.144	19.144	0.8387	18.306	137.26	1600.00
0.0000	0.0000	17.484	17.484	0.8220	16.662	137.22	1610.00
0.0000	0.0000	15.857	15.857	0.8051	15.051	137.18	1620.00
0.0000	0.0000	14.263	14.263	0.7883	13.475	137.14	1630.00
0.0000	0.0000	12.703	12.703	0.7717	11.931	137.10	1640.00
0.0000	0.0000	11.177	11.177	0.7546	10.422	137.06	1650.00
0.0000	0.0000	9.6842	9.6842	0.7380	8.9463	137.02	1660.00
0.0000	0.0000	8.2259	8.2259	0.7203	7.5056	136.98	1670.00
0.0000	0.0000	6.8042	6.8042	0.7014	6.1028	136.94	1680.00
0.0000	0.0000	5.4198	5.4198	0.6830	4.7368	136.90	1690.00
0.0000	0.0000	4.0729	4.0729	0.6639	3.4091	136.87	1700.00
0.0000	0.0000	2.7639	2.7639	0.6451	2.1188	136.83	1710.00
0.0000	0.0000	1.4963	1.4963	0.6225	0.8739	136.78	1720.00
0.0000	0.0000	0.2890	0.2890	0.5849	-0.2960	136.72	1730.00

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ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 136.20
Elev: 136.20 ft Orifice Diameter: 5.4785 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
136.20	0.0000	0.0000	0.0000	137.90	13317	1.0620	45.452	139.60	37653	1.5019	127.01
136.30	0.0000	0.2576	0.2576	138.00	14502	1.0928	49.433	139.70	39198	1.5238	132.19
136.40	0.0000	0.3643	0.3643	138.10	15890	1.1227	54.089	139.80	40744	1.5454	137.36
136.50	0.0000	0.4461	0.4461	138.20	17278	1.1519	58.745	139.90	42289	1.5667	142.53
136.60	0.0000	0.5151	0.5151	138.30	18666	1.1803	63.400	140.00	43834	1.5877	147.70
136.70	0.0000	0.5759	0.5759	138.40	20054	1.2081	68.055	140.10	45251	1.6085	152.44
136.80	530.40	0.6309	2.3989	138.50	21442	1.2352	72.709	140.20	46667	1.6290	157.19
136.90	1591	0.6815	5.9855	138.60	22830	1.2618	77.362	140.30	48084	1.6492	161.93
137.00	2652	0.7285	9.5685	138.70	24218	1.2878	82.014	140.40	49500	1.6692	166.67
137.10	3837	0.7727	13.563	138.80	25606	1.3133	86.667	140.50	50917	1.6890	171.41
137.20	5022	0.8145	17.554	138.90	26994	1.3384	91.318	140.60	52334	1.7085	176.15
137.30	6207	0.8542	21.544	139.00	28382	1.3629	95.970	140.70	53750	1.7278	180.90
137.40	7392	0.8922	25.532	139.10	29927	1.3870	101.14	140.80	55167	1.7469	185.64
137.50	8577	0.9287	29.519	139.20	31472	1.4107	106.32	140.90	56583	1.7658	190.38
137.60	9762	0.9637	33.504	139.30	33018	1.4341	111.49				
137.70	10947	0.9975	37.488	139.40	34563	1.4570	116.67				
137.80	12132	1.0303	41.470	139.50	36108	1.4796	121.84				

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MATCH Q (cfs) : 2.90 INFLOW Q (cfs): 8.23
 PEAK STAGE (ft): 140.41 PEAK OUTFLOW : 1.67
 PEAK TIME: 800.00 min.
 INFLOW HYD No. : 6 OUTFLOW HYD No.: 11

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE (ft)	TIME (min)
<----- cfs min ----->							
0.0000	0.0022	0.0000	0.0022	0.0000	0.0022	136.20	40.00
0.0022	0.0238	0.0000	0.0260	0.0022	0.0238	136.20	50.00
0.0238	0.0705	0.0000	0.0944	0.0238	0.0705	136.20	60.00
0.0705	0.1595	0.0000	0.2300	0.0705	0.1595	136.20	70.00
0.1595	0.2804	0.0000	0.4399	0.1595	0.2804	136.20	80.00
0.2804	0.3921	0.0000	0.6725	0.2804	0.3921	136.20	90.00
0.3921	0.4901	0.0000	0.8823	0.3921	0.4901	136.20	100.00
0.4901	0.5742	0.0000	1.0643	0.4901	0.5742	136.20	110.00
0.5742	0.6457	0.0000	1.2199	0.5742	0.6457	136.20	120.00
0.6457	0.7394	0.0677	1.4528	0.5780	0.8747	136.70	130.00
0.7394	0.8479	0.2898	1.8770	0.5849	1.2921	136.72	140.00
0.8479	0.9262	0.6945	2.4686	0.5975	1.8711	136.74	150.00
0.9262	0.9816	1.2561	3.1639	0.6150	2.5489	136.77	160.00
0.9816	1.0317	1.9159	3.9292	0.6330	3.2962	136.80	170.00
1.0317	1.0721	2.6526	4.7564	0.6436	4.1128	136.83	180.00
1.0721	1.1008	3.4578	5.6306	0.6551	4.9755	136.85	190.00
1.1008	1.1318	4.3083	6.5409	0.6672	5.8737	136.87	200.00
1.1318	1.1577	5.1938	7.4834	0.6799	6.8035	136.90	210.00
1.1577	1.1746	6.1113	8.4436	0.6922	7.7514	136.92	220.00
1.1746	1.1964	7.0467	9.4178	0.7046	8.7131	136.95	230.00
1.1964	1.2146	7.9958	10.407	0.7173	9.6896	136.98	240.00
1.2146	1.2737	8.9598	11.448	0.7298	10.718	137.00	250.00
1.2737	1.3532	9.9771	12.604	0.7412	11.863	137.03	260.00
1.3532	1.3994	11.109	13.861	0.7539	13.108	137.06	270.00
1.3994	1.4340	12.340	15.173	0.7677	14.406	137.09	280.00
1.4340	1.4521	13.624	16.510	0.7815	15.729	137.12	290.00
1.4521	1.4683	14.933	17.854	0.7954	17.058	137.15	300.00
1.4683	1.6787	16.249	19.396	0.8093	18.587	137.19	310.00
1.6787	1.9830	17.762	21.423	0.8248	20.599	137.23	320.00
1.9830	2.1467	19.754	23.884	0.8448	23.039	137.28	330.00
2.1467	2.2398	22.170	26.557	0.8685	25.688	137.34	340.00
2.2398	2.2969	24.795	29.331	0.8937	28.438	137.40	350.00
2.2969	2.3352	27.519	32.151	0.9188	31.232	137.47	360.00
2.3352	2.3149	30.288	34.939	0.9437	33.995	137.54	370.00
2.3149	2.2642	33.027	37.606	0.9679	36.638	137.61	380.00
2.2642	2.2399	35.648	40.152	0.9903	39.162	137.68	390.00
2.2399	2.2342	38.150	42.624	1.0113	41.613	137.74	400.00
2.2342	2.2436	40.582	45.059	1.0314	44.028	137.80	410.00
2.2436	2.2477	42.977	47.469	1.0506	46.418	137.86	420.00
2.2477	2.9341	45.349	50.531	1.0694	49.461	137.92	430.00
2.9341	3.9727	48.368	55.275	1.0929	54.182	138.00	440.00

NOVELLUS

LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
3.9727	4.5081	53.059	61.540	1.1233	60.416	138.10	450.00
4.5081	5.7611	59.254	69.523	1.1621	68.361	138.24	460.00
5.7611	7.3831	67.151	80.296	1.2099	79.086	138.41	470.00
7.3831	8.2300	77.814	93.427	1.2714	92.156	138.64	480.00
8.2300	7.3623	90.813	106.41	1.3428	105.06	138.92	490.00
7.3623	5.6284	103.66	116.65	1.4050	115.24	139.18	500.00
5.6284	4.7761	113.79	124.20	1.4507	122.75	139.37	510.00
4.7761	4.2464	121.26	130.29	1.4835	128.80	139.52	520.00
4.2464	3.8824	127.29	135.42	1.5094	133.91	139.63	530.00
3.8824	3.7062	132.38	139.97	1.5310	138.44	139.73	540.00
3.7062	3.3412	136.89	143.94	1.5498	142.39	139.82	550.00
3.3412	2.8814	140.82	147.04	1.5661	145.48	139.90	560.00
2.8814	2.6556	143.90	149.44	1.5787	147.86	139.96	570.00
2.6556	2.5522	146.27	151.48	1.5884	149.89	140.00	580.00
2.5522	2.4959	148.29	153.34	1.5973	151.74	140.05	590.00
2.4959	2.4696	150.14	155.10	1.6054	153.50	140.09	600.00
2.4696	2.4040	151.88	156.76	1.6130	155.14	140.12	610.00
2.4040	2.3189	153.52	158.25	1.6202	156.63	140.16	620.00
2.3189	2.2779	155.00	159.60	1.6266	157.97	140.19	630.00
2.2779	2.2521	156.34	160.87	1.6323	159.23	140.22	640.00
2.2521	2.2472	157.60	162.10	1.6377	160.46	140.24	650.00
2.2472	2.2459	158.82	163.31	1.6430	161.67	140.27	660.00
2.2459	2.1308	160.02	164.39	1.6481	162.75	140.29	670.00
2.1308	1.9591	161.09	165.18	1.6527	163.53	140.32	680.00
1.9591	1.8748	161.87	165.71	1.6560	164.05	140.33	690.00
1.8748	1.8405	162.39	166.11	1.6582	164.45	140.34	700.00
1.8405	1.8174	162.79	166.45	1.6599	164.79	140.35	710.00
1.8174	1.8066	163.13	166.75	1.6613	165.09	140.36	720.00
1.8066	1.8087	163.43	167.04	1.6626	165.38	140.37	730.00
1.8087	1.8035	163.72	167.33	1.6638	165.67	140.37	740.00
1.8035	1.8016	164.00	167.61	1.6650	165.94	140.38	750.00
1.8016	1.8080	164.28	167.88	1.6661	166.22	140.38	760.00
1.8080	1.8050	164.55	168.16	1.6673	166.50	140.39	770.00
1.8050	1.8040	164.83	168.44	1.6685	166.77	140.40	780.00
1.8040	1.6945	165.10	168.60	1.6696	166.93	140.40	790.00
1.6945	1.5242	165.26	168.48	1.6703	166.81	140.41	800.00
1.5242	1.4402	165.14	168.10	1.6698	166.43	140.40	810.00
1.4402	1.3989	164.76	167.60	1.6682	165.93	140.39	820.00
1.3989	1.3787	164.27	167.04	1.6661	165.38	140.38	830.00
1.3787	1.3691	163.72	166.46	1.6638	164.80	140.37	840.00
1.3691	1.4195	163.14	165.93	1.6613	164.27	140.36	850.00
1.4195	1.5067	162.61	165.53	1.6591	163.87	140.35	860.00
1.5067	1.5503	162.22	165.27	1.6574	163.62	140.34	870.00
1.5503	1.5653	161.96	165.07	1.6563	163.42	140.34	880.00
1.5653	1.5800	161.76	164.91	1.6555	163.25	140.33	890.00
1.5800	1.5877	161.60	164.77	1.6548	163.11	140.33	900.00
1.5877	1.5850	161.46	164.63	1.6542	162.97	140.32	910.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.5850	1.5909	161.32	164.50	1.6536	162.84	140.32	920.00
1.5909	1.5941	161.19	164.38	1.6531	162.72	140.32	930.00
1.5941	1.5892	161.07	164.25	1.6526	162.60	140.32	940.00
1.5892	1.5940	160.95	164.13	1.6521	162.48	140.31	950.00
1.5940	1.5968	160.83	164.02	1.6515	162.37	140.31	960.00
1.5968	1.4188	160.72	163.73	1.6511	162.08	140.31	970.00
1.4188	1.1652	160.43	163.01	1.6499	161.37	140.30	980.00
1.1652	1.0397	159.72	161.92	1.6468	160.28	140.29	990.00
1.0397	0.9708	158.63	160.64	1.6422	159.00	140.27	1000.00
0.9708	0.9437	157.37	159.28	1.6367	157.64	140.24	1010.00
0.9437	0.9304	156.01	157.89	1.6309	156.26	140.21	1020.00
0.9304	1.0346	154.63	156.60	1.6250	154.97	140.18	1030.00
1.0346	1.2040	153.35	155.59	1.6194	153.97	140.15	1040.00
1.2040	1.2880	152.36	154.85	1.6151	153.23	140.13	1050.00
1.2880	1.3299	151.62	154.24	1.6119	152.63	140.12	1060.00
1.3299	1.3508	151.02	153.70	1.6093	152.09	140.10	1070.00
1.3508	1.3614	150.48	153.19	1.6069	151.59	140.09	1080.00
1.3614	1.3114	149.98	152.66	1.6047	151.05	140.08	1090.00
1.3114	1.2245	149.45	151.98	1.6024	150.38	140.07	1100.00
1.2245	1.1816	148.78	151.19	1.5995	149.59	140.06	1110.00
1.1816	1.3755	147.99	150.55	1.5960	148.95	140.04	1120.00
1.3755	1.2567	147.36	149.99	1.5932	148.40	140.03	1130.00
1.2567	0.9899	146.81	149.06	1.5908	147.46	140.01	1140.00
0.9899	1.0730	145.88	147.94	1.5868	146.35	140.00	1150.00
1.0730	1.1073	144.77	146.95	1.5823	145.37	139.97	1160.00
1.1073	1.1245	143.79	146.02	1.5783	144.44	139.95	1170.00
1.1245	1.1400	142.87	145.13	1.5745	143.56	139.94	1180.00
1.1400	1.1409	141.99	144.27	1.5709	142.70	139.92	1190.00
1.1409	1.1415	141.13	143.41	1.5674	141.85	139.90	1200.00
1.1415	1.1489	140.28	142.57	1.5639	141.01	139.89	1210.00
1.1489	1.1457	139.45	141.74	1.5604	140.18	139.87	1220.00
1.1457	1.1443	138.63	140.92	1.5570	139.36	139.85	1230.00
1.1443	1.1507	137.81	140.10	1.5536	138.55	139.84	1240.00
1.1507	1.1470	137.00	139.29	1.5503	137.74	139.82	1250.00
1.1470	1.1453	136.20	138.49	1.5470	136.94	139.81	1260.00
1.1453	1.1516	135.40	137.70	1.5437	136.15	139.79	1270.00
1.1516	1.1479	134.61	136.91	1.5404	135.37	139.78	1280.00
1.1479	1.1461	133.83	136.13	1.5371	134.59	139.76	1290.00
1.1461	1.1524	133.06	135.36	1.5338	133.82	139.75	1300.00
1.1524	1.1486	132.29	134.59	1.5306	133.06	139.73	1310.00
1.1486	1.1469	131.53	133.83	1.5274	132.30	139.72	1320.00
1.1469	1.0904	130.78	133.01	1.5243	131.49	139.70	1330.00
1.0904	1.0068	129.97	132.07	1.5208	130.55	139.69	1340.00
1.0068	0.9654	129.03	131.00	1.5168	129.48	139.67	1350.00
0.9654	0.9381	127.97	129.88	1.5123	128.36	139.65	1360.00
0.9381	0.9316	126.86	128.73	1.5076	127.22	139.63	1370.00
0.9316	0.9285	125.72	127.58	1.5027	126.07	139.60	1380.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.9285	0.9200	124.57	126.42	1.4978	124.93	139.58	1390.00
0.9200	0.9229	123.43	125.28	1.4929	123.78	139.56	1400.00
0.9229	0.9244	122.29	124.14	1.4880	122.65	139.54	1410.00
0.9244	0.9182	121.17	123.01	1.4831	121.53	139.52	1420.00
0.9182	0.9222	120.05	121.89	1.4783	120.41	139.49	1430.00
0.9222	0.9243	118.94	120.79	1.4734	119.31	139.47	1440.00
0.9243	0.6880	117.85	119.46	1.4686	117.99	139.45	1450.00
0.6880	0.3406	116.53	117.55	1.4628	116.09	139.43	1460.00
0.3406	0.1686	114.64	115.15	1.4545	113.69	139.39	1470.00
0.1686	0.0835	112.25	112.50	1.4438	111.06	139.34	1480.00
0.0835	0.0413	109.62	109.75	1.4321	108.32	139.29	1490.00
0.0413	0.0205	106.90	106.96	1.4198	105.54	139.24	1500.00
0.0205	0.0101	104.13	104.16	1.4072	102.76	139.18	1510.00
0.0101	0.0050	101.36	101.38	1.3944	99.982	139.13	1520.00
0.0050	0.0025	98.601	98.608	1.3816	97.226	139.08	1530.00
0.0025	0.0012	95.858	95.861	1.3688	94.493	139.02	1540.00
0.0012	0.0006	93.137	93.139	1.3551	91.784	138.97	1550.00
0.0006	0.0003	90.443	90.444	1.3408	89.104	138.91	1560.00
0.0003	0.0001	87.777	87.778	1.3264	86.451	138.85	1570.00
0.0001	0.0001	85.139	85.139	1.3122	83.827	138.80	1580.00
0.0001	0.0000	82.529	82.529	1.2978	81.232	138.74	1590.00
0.0000	0.0000	79.948	79.948	1.2834	78.665	138.68	1600.00
0.0000	0.0000	77.396	77.396	1.2691	76.127	138.63	1610.00
0.0000	0.0000	74.872	74.872	1.2548	73.617	138.57	1620.00
0.0000	0.0000	72.377	72.377	1.2404	71.136	138.52	1630.00
0.0000	0.0000	69.910	69.910	1.2261	68.684	138.47	1640.00
0.0000	0.0000	67.472	67.472	1.2118	66.261	138.41	1650.00
0.0000	0.0000	65.063	65.063	1.1974	63.866	138.36	1660.00
0.0000	0.0000	62.683	62.683	1.1831	61.500	138.31	1670.00
0.0000	0.0000	60.331	60.331	1.1687	59.162	138.26	1680.00
0.0000	0.0000	58.008	58.008	1.1544	56.853	138.21	1690.00
0.0000	0.0000	55.713	55.713	1.1400	54.573	138.16	1700.00
0.0000	0.0000	53.448	53.448	1.1257	52.322	138.11	1710.00
0.0000	0.0000	51.211	51.211	1.1113	50.099	138.06	1720.00
0.0000	0.0000	49.002	49.002	1.0970	47.905	138.01	1730.00
0.0000	0.0000	46.824	46.824	1.0809	45.743	137.96	1740.00
0.0000	0.0000	44.679	44.679	1.0642	43.615	137.91	1750.00
0.0000	0.0000	42.567	42.567	1.0473	41.520	137.85	1760.00
0.0000	0.0000	40.489	40.489	1.0307	39.459	137.80	1770.00
0.0000	0.0000	38.445	38.445	1.0137	37.431	137.75	1780.00
0.0000	0.0000	36.434	36.434	0.9971	35.437	137.70	1790.00
0.0000	0.0000	34.457	34.457	0.9801	33.477	137.65	1800.00
0.0000	0.0000	32.513	32.513	0.9635	31.550	137.60	1810.00
0.0000	0.0000	30.603	30.603	0.9465	29.657	137.55	1820.00
0.0000	0.0000	28.727	28.727	0.9299	27.797	137.50	1830.00
0.0000	0.0000	26.884	26.884	0.9129	25.971	137.46	1840.00
0.0000	0.0000	25.075	25.075	0.8962	24.179	137.41	1850.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.0000	0.0000	23.299	23.299	0.8793	22.420	137.37	1860.00
0.0000	0.0000	21.557	21.557	0.8626	20.695	137.32	1870.00
0.0000	0.0000	19.849	19.849	0.8458	19.003	137.28	1880.00
0.0000	0.0000	18.174	18.174	0.8289	17.345	137.24	1890.00
0.0000	0.0000	16.533	16.533	0.8123	15.721	137.19	1900.00
0.0000	0.0000	14.926	14.926	0.7953	14.130	137.15	1910.00
0.0000	0.0000	13.352	13.352	0.7786	12.573	137.11	1920.00
0.0000	0.0000	11.811	11.811	0.7617	11.049	137.08	1930.00
0.0000	0.0000	10.305	10.305	0.7449	9.5597	137.04	1940.00
0.0000	0.0000	8.8313	8.8313	0.7284	8.1029	137.00	1950.00
0.0000	0.0000	7.3937	7.3937	0.7093	6.6844	136.96	1960.00
0.0000	0.0000	5.9938	5.9938	0.6906	5.3031	136.92	1970.00
0.0000	0.0000	4.6313	4.6313	0.6718	3.9595	136.88	1980.00
0.0000	0.0000	3.3066	3.3066	0.6529	2.6537	136.84	1990.00
0.0000	0.0000	2.0192	2.0192	0.6345	1.3847	136.81	2000.00
0.0000	0.0000	0.7843	0.7843	0.6003	0.1840	136.74	2010.00
0.0000	0.0000	0.0000	0.0000	0.1840	-0.1840	136.70	2020.00

NOVELLUS

ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 136.20
Elev: 136.20 ft Orifice Diameter: 5.4785 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
136.20	0.0000	0.0000	0.0000	137.90	13317	1.0620	45.452	139.60	37653	1.5019	127.01
136.30	0.0000	0.2576	0.2576	138.00	14502	1.0928	49.433	139.70	39198	1.5238	132.19
136.40	0.0000	0.3643	0.3643	138.10	15890	1.1227	54.089	139.80	40744	1.5454	137.36
136.50	0.0000	0.4461	0.4461	138.20	17278	1.1519	58.745	139.90	42289	1.5667	142.53
136.60	0.0000	0.5151	0.5151	138.30	18666	1.1803	63.400	140.00	43834	1.5877	147.70
136.70	0.0000	0.5759	0.5759	138.40	20054	1.2081	68.055	140.10	45251	1.6085	152.44
136.80	530.40	0.6309	2.3989	138.50	21442	1.2352	72.709	140.20	46667	1.6290	157.19
136.90	1591	0.6815	5.9855	138.60	22830	1.2618	77.362	140.30	48084	1.6492	161.93
137.00	2652	0.7285	9.5685	138.70	24218	1.2878	82.014	140.40	49500	1.6692	166.67
137.10	3837	0.7727	13.563	138.80	25606	1.3133	86.667	140.50	50917	1.6890	171.41
137.20	5022	0.8145	17.554	138.90	26994	1.3384	91.318	140.60	52334	1.7085	176.15
137.30	6207	0.8542	21.544	139.00	28382	1.3629	95.970	140.70	53750	1.7278	180.90
137.40	7392	0.8922	25.532	139.10	29927	1.3870	101.14	140.80	55167	1.7469	185.64
137.50	8577	0.9287	29.519	139.20	31472	1.4107	106.32	140.90	56583	1.7658	190.38
137.60	9762	0.9637	33.504	139.30	33018	1.4341	111.49				
137.70	10947	0.9975	37.488	139.40	34563	1.4570	116.67				
137.80	12132	1.0303	41.470	139.50	36108	1.4796	121.84				

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MATCH Q (cfs) : 3.71 INFLOW Q (cfs): 9.42
 PEAK STAGE (ft): 140.97 PEAK OUTFLOW : 1.78
 PEAK TIME: 660.00 min.
 INFLOW HYD No. : 7 OUTFLOW HYD No.: 12

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE (ft)	TIME (min)
<----- cfs min ----->							
0.0000	0.0101	0.0000	0.0101	0.0000	0.0101	136.20	40.00
0.0101	0.0511	0.0000	0.0612	0.0101	0.0511	136.20	50.00
0.0511	0.1172	0.0000	0.1684	0.0511	0.1172	136.20	60.00
0.1172	0.2314	0.0000	0.3486	0.1172	0.2314	136.20	70.00
0.2314	0.3813	0.0000	0.6127	0.2314	0.3813	136.20	80.00
0.3813	0.5133	0.0000	0.8946	0.3813	0.5133	136.20	90.00
0.5133	0.6254	0.0000	1.1387	0.5133	0.6254	136.20	100.00
0.6254	0.7193	0.0480	1.3927	0.5774	0.8152	136.70	110.00
0.7193	0.7978	0.2321	1.7492	0.5832	1.1660	136.71	120.00
0.7978	0.9030	0.5723	2.2730	0.5937	1.6793	136.73	130.00
0.9030	1.0258	1.0701	2.9989	0.6092	2.3897	136.76	140.00
1.0258	1.1121	1.7590	3.8970	0.6306	3.2663	136.80	150.00
1.1121	1.1713	2.6232	4.9067	0.6431	4.2635	136.82	160.00
1.1713	1.2245	3.6063	6.0021	0.6572	5.3449	136.85	170.00
1.2245	1.2665	4.6725	7.1635	0.6724	6.4911	136.88	180.00
1.2665	1.2954	5.8030	8.3649	0.6881	7.6768	136.91	190.00
1.2954	1.3274	6.9731	9.5958	0.7037	8.8922	136.95	200.00
1.3274	1.3536	8.1725	10.854	0.7196	10.134	136.98	210.00
1.3536	1.3698	9.3991	12.123	0.7348	11.388	137.01	220.00
1.3698	1.3920	10.639	13.401	0.7486	12.652	137.05	230.00
1.3920	1.4103	11.890	14.692	0.7626	13.929	137.08	240.00
1.4103	1.4760	13.153	16.039	0.7765	15.263	137.11	250.00
1.4760	1.5658	14.472	17.514	0.7905	16.723	137.14	260.00
1.5658	1.6191	15.918	19.102	0.8058	18.297	137.18	270.00
1.6191	1.6610	17.475	20.755	0.8219	19.933	137.22	280.00
1.6610	1.6838	19.095	22.440	0.8382	21.601	137.26	290.00
1.6838	1.7030	20.747	24.133	0.8548	23.279	137.30	300.00
1.7030	1.9460	22.408	26.057	0.8708	25.186	137.34	310.00
1.9460	2.2967	24.297	28.540	0.8889	27.651	137.39	320.00
2.2967	2.4840	26.739	31.520	0.9116	30.609	137.45	330.00
2.4840	2.5893	29.670	34.744	0.9383	33.805	137.53	340.00
2.5893	2.6528	32.839	38.081	0.9663	37.115	137.61	350.00
2.6528	2.6948	36.120	41.468	0.9944	40.474	137.69	360.00
2.6948	2.6693	39.452	44.816	1.0221	43.794	137.77	370.00
2.6693	2.6091	42.745	48.023	1.0488	46.974	137.86	380.00
2.6091	2.5794	45.901	51.089	1.0737	50.015	137.94	390.00
2.5794	2.5714	48.919	54.070	1.0965	52.973	138.01	400.00
2.5714	2.5808	51.858	57.010	1.1155	55.894	138.08	410.00
2.5808	2.5843	54.760	59.925	1.1340	58.791	138.14	420.00
2.5843	3.3711	57.639	63.595	1.1522	62.443	138.20	430.00
3.3711	4.5616	61.268	69.201	1.1745	68.026	138.28	440.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
4.5616	5.1730	66.818	76.553	1.2079	75.345	138.40	450.00
5.1730	6.6055	74.095	85.873	1.2503	84.623	138.56	460.00
6.6055	8.4586	83.321	98.385	1.3021	97.083	138.76	470.00
8.4586	9.4219	95.715	113.60	1.3681	112.23	139.02	480.00
9.4219	8.4243	110.79	128.64	1.4373	127.20	139.31	490.00
8.4243	6.4378	125.70	140.56	1.5026	139.06	139.60	500.00
6.4378	5.4605	137.50	149.40	1.5524	147.85	139.83	510.00
5.4605	4.8532	146.26	156.57	1.5884	154.99	140.00	520.00
4.8532	4.4357	153.37	162.66	1.6195	161.04	140.15	530.00
4.4357	4.2333	159.39	168.06	1.6454	166.41	140.28	540.00
4.2333	3.8155	164.75	172.79	1.6681	171.13	140.39	550.00
3.8155	3.2899	169.44	176.54	1.6878	174.86	140.49	560.00
3.2899	3.0315	173.15	179.47	1.7032	177.77	140.57	570.00
3.0315	2.9129	176.06	182.00	1.7151	180.29	140.63	580.00
2.9129	2.8482	178.56	184.32	1.7253	182.60	140.69	590.00
2.8482	2.8179	180.86	186.53	1.7347	184.79	140.74	600.00
2.8179	2.7427	183.05	188.61	1.7435	186.87	140.78	610.00
2.7427	2.6453	185.11	190.50	1.7518	188.75	140.83	620.00
2.6453	2.5983	186.99	192.23	1.7593	190.48	140.87	630.00
2.5983	2.5685	188.71	193.88	1.7662	192.11	140.90	640.00
2.5685	2.5626	190.34	195.47	1.7726	193.70	140.94	650.00
2.5626	2.5609	191.92	197.04	1.7789	195.26	140.97	660.00
2.5609	2.4294	195.26	200.25	0.0000	200.25	0.00	670.00
2.4294	2.2335	200.25	204.91	0.0000	204.91	0.00	680.00
2.2335	2.1372	204.91	209.29	0.0000	209.29	0.00	690.00
2.1372	2.0979	209.29	213.52	0.0000	213.52	0.00	700.00
2.0979	2.0714	213.52	217.69	0.0000	217.69	0.00	710.00
2.0714	2.0589	217.69	221.82	0.0000	221.82	0.00	720.00
2.0589	2.0611	221.82	225.94	0.0000	225.94	0.00	730.00
2.0611	2.0551	225.94	230.06	0.0000	230.06	0.00	740.00
2.0551	2.0527	230.06	234.16	0.0000	234.16	0.00	750.00
2.0527	2.0599	234.16	238.28	0.0000	238.28	0.00	760.00
2.0599	2.0563	238.28	242.39	0.0000	242.39	0.00	770.00
2.0563	2.0551	242.39	246.50	0.0000	246.50	0.00	780.00
2.0551	1.9302	246.50	250.49	0.0000	250.49	0.00	790.00
1.9302	1.7361	250.49	254.16	0.0000	254.16	0.00	800.00
1.7361	1.6403	254.16	257.53	0.0000	257.53	0.00	810.00
1.6403	1.5932	257.53	260.77	0.0000	260.77	0.00	820.00
1.5932	1.5702	260.77	263.93	0.0000	263.93	0.00	830.00
1.5702	1.5591	263.93	267.06	0.0000	267.06	0.00	840.00
1.5591	1.6165	267.06	270.23	0.0000	270.23	0.00	850.00
1.6165	1.7157	270.23	273.57	0.0000	273.57	0.00	860.00
1.7157	1.7652	273.57	277.05	0.0000	277.05	0.00	870.00
1.7652	1.7822	277.05	280.60	0.0000	280.60	0.00	880.00
1.7822	1.7989	280.60	284.18	0.0000	284.18	0.00	890.00
1.7989	1.8075	284.18	287.78	0.0000	287.78	0.00	900.00
1.8075	1.8043	287.78	291.39	0.0000	291.39	0.00	910.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.8043	1.8110	291.39	295.01	0.0000	295.01	0.00	920.00
1.8110	1.8146	295.01	298.64	0.0000	298.64	0.00	930.00
1.8146	1.8089	298.64	302.26	0.0000	302.26	0.00	940.00
1.8089	1.8143	302.26	305.88	0.0000	305.88	0.00	950.00
1.8143	1.8173	305.88	309.51	0.0000	309.51	0.00	960.00
1.8173	1.6148	309.51	312.95	0.0000	312.95	0.00	970.00
1.6148	1.3260	312.95	315.89	0.0000	315.89	0.00	980.00
1.3260	1.1832	315.89	318.40	0.0000	318.40	0.00	990.00
1.1832	1.1048	318.40	320.68	0.0000	320.68	0.00	1000.00
1.1048	1.0739	320.68	322.86	0.0000	322.86	0.00	1010.00
1.0739	1.0587	322.86	325.00	0.0000	325.00	0.00	1020.00
1.0587	1.1772	325.00	327.23	0.0000	327.23	0.00	1030.00
1.1772	1.3699	327.23	329.78	0.0000	329.78	0.00	1040.00
1.3699	1.4655	329.78	332.61	0.0000	332.61	0.00	1050.00
1.4655	1.5130	332.61	335.59	0.0000	335.59	0.00	1060.00
1.5130	1.5368	335.59	338.64	0.0000	338.64	0.00	1070.00
1.5368	1.5488	338.64	341.73	0.0000	341.73	0.00	1080.00
1.5488	1.4919	341.73	344.77	0.0000	344.77	0.00	1090.00
1.4919	1.3929	344.77	347.65	0.0000	347.65	0.00	1100.00
1.3929	1.3441	347.65	350.39	0.0000	350.39	0.00	1110.00
1.3441	1.5647	350.39	353.30	0.0000	353.30	0.00	1120.00
1.5647	1.4294	353.30	356.29	0.0000	356.29	0.00	1130.00
1.4294	1.1259	356.29	358.85	0.0000	358.85	0.00	1140.00
1.1259	1.2204	358.85	361.19	0.0000	361.19	0.00	1150.00
1.2204	1.2594	361.19	363.67	0.0000	363.67	0.00	1160.00
1.2594	1.2789	363.67	366.21	0.0000	366.21	0.00	1170.00
1.2789	1.2965	366.21	368.79	0.0000	368.79	0.00	1180.00
1.2965	1.2975	368.79	371.38	0.0000	371.38	0.00	1190.00
1.2975	1.2982	371.38	373.98	0.0000	373.98	0.00	1200.00
1.2982	1.3065	373.98	376.58	0.0000	376.58	0.00	1210.00
1.3065	1.3029	376.58	379.19	0.0000	379.19	0.00	1220.00
1.3029	1.3012	379.19	381.80	0.0000	381.80	0.00	1230.00
1.3012	1.3084	381.80	384.41	0.0000	384.41	0.00	1240.00
1.3084	1.3042	384.41	387.02	0.0000	387.02	0.00	1250.00
1.3042	1.3023	387.02	389.62	0.0000	389.62	0.00	1260.00
1.3023	1.3094	389.62	392.24	0.0000	392.24	0.00	1270.00
1.3094	1.3051	392.24	394.85	0.0000	394.85	0.00	1280.00
1.3051	1.3031	394.85	397.46	0.0000	397.46	0.00	1290.00
1.3031	1.3102	397.46	400.07	0.0000	400.07	0.00	1300.00
1.3102	1.3059	400.07	402.69	0.0000	402.69	0.00	1310.00
1.3059	1.3038	402.69	405.30	0.0000	405.30	0.00	1320.00
1.3038	1.2396	405.30	407.84	0.0000	407.84	0.00	1330.00
1.2396	1.1445	407.84	410.23	0.0000	410.23	0.00	1340.00
1.1445	1.0975	410.23	412.47	0.0000	412.47	0.00	1350.00
1.0975	1.0664	412.47	414.63	0.0000	414.63	0.00	1360.00
1.0664	1.0590	414.63	416.76	0.0000	416.76	0.00	1370.00
1.0590	1.0554	416.76	418.87	0.0000	418.87	0.00	1380.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
1.0554	1.0458	418.87	420.97	0.0000	420.97	0.00	1390.00
1.0458	1.0490	420.97	423.07	0.0000	423.07	0.00	1400.00
1.0490	1.0507	423.07	425.17	0.0000	425.17	0.00	1410.00
1.0507	1.0437	425.17	427.26	0.0000	427.26	0.00	1420.00
1.0437	1.0482	427.26	429.35	0.0000	429.35	0.00	1430.00
1.0482	1.0505	429.35	431.45	0.0000	431.45	0.00	1440.00
1.0505	0.7819	431.45	433.28	0.0000	433.28	0.00	1450.00
0.7819	0.3871	433.28	434.45	0.0000	434.45	0.00	1460.00
0.3871	0.1916	434.45	435.03	0.0000	435.03	0.00	1470.00
0.1916	0.0949	435.03	435.32	0.0000	435.32	0.00	1480.00
0.0949	0.0470	435.32	435.46	0.0000	435.46	0.00	1490.00
0.0470	0.0233	435.46	435.53	0.0000	435.53	0.00	1500.00

'S' - POND 'C' TOTAL VOLUME

ELEV (FT)	AREA (SF)	VOL (CF)	CUMM VOL (CCF)
133.5	6500		
134	7015	3379	3379
135	8904	7960	11,339
136	10,849	9697	21,036
137	14,909	12879	33,915
138	17,023	15966	49881
139	21,230	19,127	69,007

← WQ VOL @ 135.52

WQ RELEASE RATE

$$\frac{16,409 \text{ ft}^3}{48 \text{ HRS}} \times \frac{1 \text{ HR}}{3600 \text{ s}} = 0.095 \text{ cfs}$$

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

By _____

Date _____

Job # _____

Sht. _____ of _____

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'T' - POND 'C' DETENTION VOLUME

ELEV (CFT)	AREA (SF)	VOL (CF)	CUMM. VOL (CF)
135.52	9,915		
136	10,819	4983	4983
137	14,909	12,879	17,862
138	17,023	15,966	33,828
139	21,230	19,127	52,955

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

By _____

Date _____

Job # _____

Sht. _____ of _____

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'U' - WQ ORIFICE 'C'

$$Q = CA(2gh)^{1/2}$$

$$A = \frac{Q}{C(2gh)^{1/2}}$$

$$A = \frac{0.095}{0.62(2 \times 32.2 \times 0.62)^{1/2}}$$

$$A = 0.024 \text{ ft}^2$$

$$Q = 0.095 \text{ cfs}$$

$$C = 0.62$$

$$g = 32.2$$

$$h = 135.52' - 134.90' = 0.62'$$

$$A = \frac{\pi d^2}{4}$$

$$d = \sqrt{\frac{4A}{\pi}}$$

$$d = \sqrt{\frac{4A}{\pi}} = 0.178' = \underline{\underline{2.10'' \phi}}$$

GROUP

MACKENZIE

0690 SW Bancroft St/PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

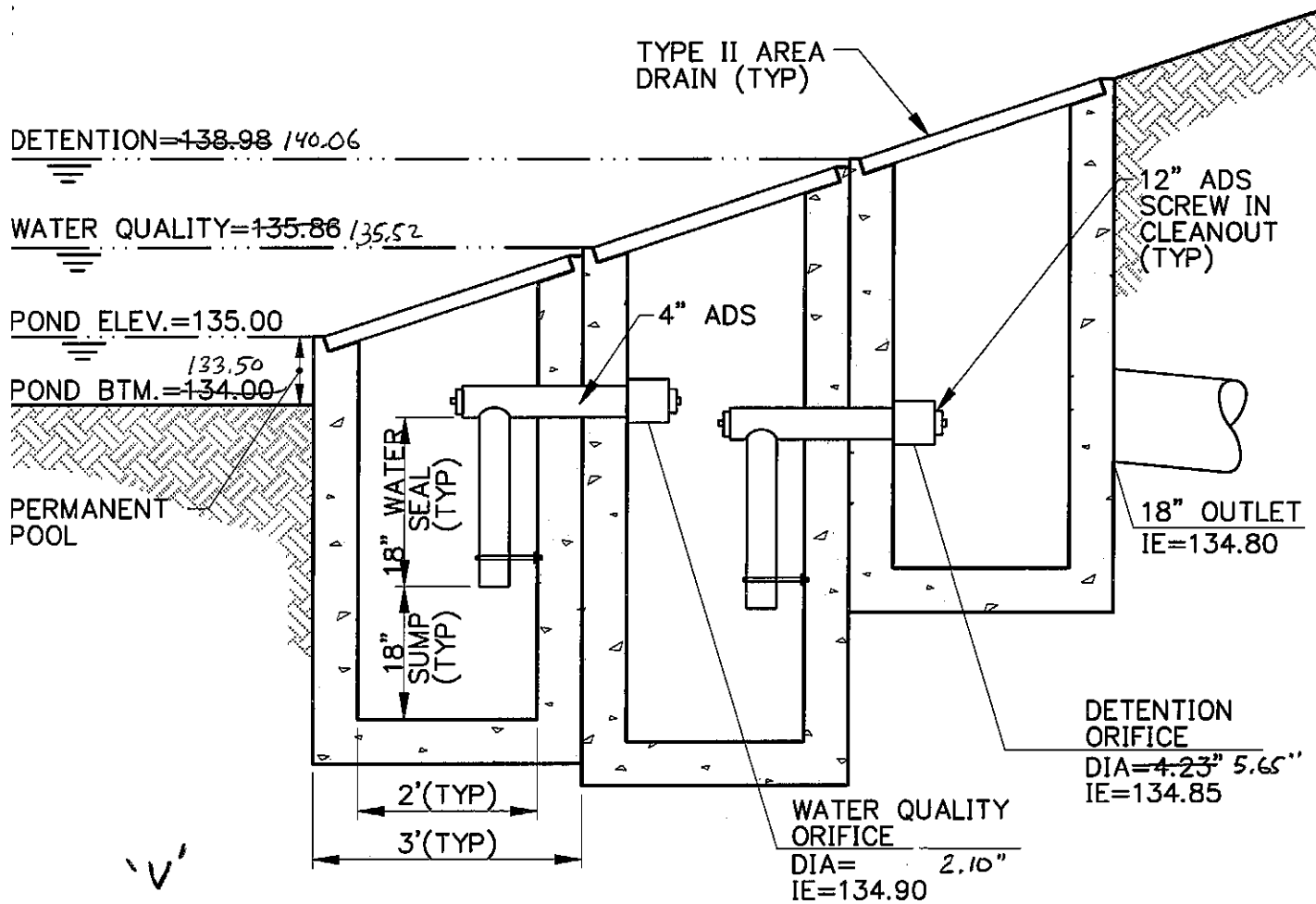
By _____

Date _____

Job # _____

Sht. _____ of _____

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3
C8.1

POND "C" OUTLET DETAIL

N.T.S.
OUTFLOW DEVICE

SD150
DETINSET= 1:1

NOVELLUS

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BASIN SUMMARY

BASIN ID: D10 NAME: DEVELOPED 10YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.45 inches AREA...: 2.32 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 14.80 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 12.45 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 8.82 cfs VOL: 3.65 Ac-ft TIME: 480 min

BASIN ID: D2 NAME: DEVELOPED 2YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 2.50 inches AREA...: 2.32 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 14.80 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 12.45 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 6.14 cfs VOL: 2.53 Ac-ft TIME: 480 min

BASIN ID: D25 NAME: DEVELOPED 25YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.90 inches AREA...: 2.32 Acres
TIME INTERVAL.....: 10.00 min CN.....: 80.00
TIME OF CONC.....: 14.80 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 12.45 Acres
 CN.....: 98.00
TcReach - Sheet L: 30.00 ns:0.2400 p2yr: 2.50 s:0.0200
TcReach - Sheet L: 150.00 ns:0.0110 p2yr: 2.50 s:0.0200
TcReach - Channel L:1700.00 kc:42.00 s:0.0100
PEAK RATE: 10.10 cfs VOL: 4.18 Ac-ft TIME: 480 min

NOVELLUS

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BASIN SUMMARY

BASIN ID: E10 NAME: EXISTING 10YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.45 inches AREA...: 14.77 Acres
TIME INTERVAL.....: 10.00 min CN....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 3.12 cfs VOL: 1.97 Ac-ft TIME: 490 min

BASIN ID: E2 NAME: EXISTING 2YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 2.50 inches AREA...: 14.77 Acres
TIME INTERVAL.....: 10.00 min CN....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 1.46 cfs VOL: 1.09 Ac-ft TIME: 490 min

BASIN ID: E25 NAME: EXISTING 25YR STORM
SBUH METHODOLOGY
TOTAL AREA.....: 14.77 Acres BASEFLOWS: 0.00 cfs
RAINFALL TYPE.....: TYPE1A PERVIOUS AREA
PRECIPITATION.....: 3.90 inches AREA...: 14.77 Acres
TIME INTERVAL.....: 10.00 min CN....: 80.00
TIME OF CONC.....: 38.83 min IMPERVIOUS AREA
ABSTRACTION COEFF: 0.20 AREA...: 0.00 Acres
 CN....: 98.00
TcReach - Sheet L: 300.00 ns:0.2400 p2yr: 2.50 s:0.0400
TcReach - Shallow L: 300.00 ks:10.00 s:0.0400
TcReach - Channel L:1400.00 kc:17.00 s:0.0400
PEAK RATE: 4.00 cfs VOL: 2.41 Ac-ft TIME: 490 min

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HYDROGRAPH SUMMARY

HYD NUM	PEAK RUNOFF RATE cfs	TIME OF PEAK min.	VOLUME OF HYDRO cf\AcFt	Contrib Area Acres
1	1.460	490	47658 cf	14.77
2	3.124	490	85612 cf	14.77
3	3.999	490	105049 cf	14.77
5	6.139	480	110109 cf	14.77
6	8.822	480	158818 cf	14.77
7	10.104	480	182151 cf	14.77
10	1.460	690	110176 cf	14.77
11	1.760	800	158945 cf	14.77
12	1.976	800	182266 cf	14.77

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ROUTING REPORT

STORAGE LIST ID No. A
Description:MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 134.85
Elev: 134.85 ft Orifice Diameter: 5.6484 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
134.85	0.0000	0.0000	0.0000	136.90	16574	1.2396	56.487	139.00	52955	1.7638	178.28
134.90	0.0000	0.1936	0.1936	137.00	17862	1.2695	60.810	139.10	53960	1.7849	181.65
135.00	0.0000	0.3353	0.3353	137.10	19459	1.2987	66.161	139.20	54964	1.8058	185.02
135.10	0.0000	0.4329	0.4329	137.20	21055	1.3272	71.511	139.30	55969	1.8264	188.39
135.20	0.0000	0.5122	0.5122	137.30	22652	1.3552	76.861	139.40	56973	1.8468	191.76
135.30	0.0000	0.5808	0.5808	137.40	24248	1.3826	82.211	139.50	57978	1.8670	195.13
135.40	0.0000	0.6421	0.6421	137.50	25845	1.4094	87.559	139.60	58982	1.8870	198.49
135.50	0.0000	0.6980	0.6980	137.60	27442	1.4358	92.908	139.70	59987	1.9067	201.86
135.60	830.50	0.7498	3.5181	137.70	29038	1.4616	98.256	139.80	60991	1.9263	205.23
135.70	1869	0.7982	7.0270	137.80	30635	1.4871	103.60	139.90	61996	1.9456	208.60
135.80	2907	0.8439	10.533	137.90	32231	1.5121	108.95	140.00	63000	1.9648	211.96
135.90	3945	0.8872	14.037	138.00	33828	1.5366	114.30	140.10	64500	1.9838	216.98
136.00	4983	0.9285	17.538	138.10	35741	1.5608	120.70	140.20	66000	2.0026	222.00
136.10	6271	0.9680	21.871	138.20	37653	1.5847	127.10	140.30	67500	2.0212	227.02
136.20	7559	1.0060	26.202	138.30	39566	1.6082	133.50	140.40	69000	2.0397	232.04
136.30	8847	1.0426	30.532	138.40	41479	1.6313	139.89	140.50	70500	2.0580	237.06
136.40	10135	1.0779	34.860	138.50	43392	1.6541	146.29	140.60	72000	2.0761	242.08
136.50	11423	1.1121	39.187	138.60	45304	1.6766	152.69	140.70	73500	2.0941	247.09
136.60	12710	1.1453	43.513	138.70	47217	1.6988	159.09	140.80	75000	2.1119	252.11
136.70	13998	1.1776	47.839	138.80	49130	1.7207	165.49	140.90	76500	2.1296	257.13
136.80	15286	1.2090	52.163	138.90	51042	1.7424	171.88				

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 1.46 INFLOW Q (cfs): 6.14
 PEAK STAGE (ft): 137.70 PEAK OUTFLOW : 1.46
 PEAK TIME: 690.00 min.
 INFLOW HYD No. : 5 OUTFLOW HYD No.: 10

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0001	0.0000	0.0001	0.0000	0.0001	134.85	50.00
0.0001	0.0076	0.0000	0.0076	0.0001	0.0076	134.85	60.00
0.0076	0.0433	0.0000	0.0508	0.0076	0.0433	134.85	70.00
0.0433	0.1072	0.0000	0.1504	0.0433	0.1072	134.85	80.00
0.1072	0.1787	0.0000	0.2859	0.1072	0.1787	134.85	90.00
0.1787	0.2482	0.0000	0.4269	0.1787	0.2482	134.85	100.00
0.2482	0.3120	0.0000	0.5602	0.2482	0.3120	134.85	110.00
0.3120	0.3689	0.0000	0.6809	0.3120	0.3689	134.85	120.00
0.3689	0.4400	0.0000	0.8089	0.3689	0.4400	134.85	130.00
0.4400	0.5209	0.0000	0.9609	0.4400	0.5209	134.85	140.00
0.5209	0.5837	0.0000	1.1046	0.5209	0.5837	134.85	150.00
0.5837	0.6317	0.0000	1.2153	0.5837	0.6317	134.85	160.00
0.6317	0.6758	0.0000	1.3075	0.6317	0.6758	134.85	170.00
0.6758	0.7129	0.0000	1.3887	0.6758	0.7129	134.85	180.00
0.7129	0.7415	0.0146	1.4689	0.6983	0.7706	135.50	190.00
0.7415	0.7711	0.0713	1.5839	0.6994	0.8845	135.50	200.00
0.7711	0.7965	0.1830	1.7506	0.7015	1.0492	135.51	210.00
0.7965	0.8151	0.3447	1.9563	0.7045	1.2518	135.51	220.00
0.8151	0.8367	0.5436	2.1954	0.7082	1.4872	135.52	230.00
0.8367	0.8552	0.7747	2.4667	0.7125	1.7542	135.53	240.00
0.8552	0.9028	1.0367	2.7947	0.7174	2.0773	135.54	250.00
0.9028	0.9647	1.3540	3.2215	0.7234	2.4981	135.55	260.00
0.9647	1.0030	1.7670	3.7348	0.7311	3.0037	135.56	270.00
1.0030	1.0328	2.2633	4.2992	0.7404	3.5588	135.58	280.00
1.0328	1.0497	2.8084	4.8909	0.7504	4.1406	135.60	290.00
1.0497	1.0638	3.3822	5.4956	0.7584	4.7372	135.62	300.00
1.0638	1.2177	3.9706	6.2521	0.7666	5.4855	135.63	310.00
1.2177	1.4390	4.7085	7.3653	0.7770	6.5883	135.66	320.00
1.4390	1.5578	5.7961	8.7929	0.7922	8.0007	135.69	330.00
1.5578	1.6247	7.1898	10.372	0.8109	9.5614	135.73	340.00
1.6247	1.6659	8.7301	12.021	0.8312	11.189	135.77	350.00
1.6659	1.6953	10.337	13.699	0.8520	12.847	135.82	360.00
1.6953	1.6835	11.974	15.353	0.8725	14.481	135.87	370.00
1.6835	1.6500	13.588	16.922	0.8924	16.029	135.91	380.00
1.6500	1.6357	15.119	18.404	0.9107	17.494	135.96	390.00
1.6357	1.6349	16.566	19.836	0.9279	18.908	136.00	400.00
1.6349	1.6449	17.967	21.247	0.9410	20.306	136.03	410.00
1.6449	1.6508	19.352	22.648	0.9537	21.694	136.06	420.00
1.6508	2.1604	20.728	24.539	0.9664	23.573	136.10	430.00
2.1604	2.9320	22.590	27.682	0.9829	26.699	136.14	440.00
2.9320	3.3346	25.689	31.956	1.0102	30.946	136.21	450.00

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
3.3346	4.2741	29.900	37.508	1.0459	36.462	136.31	460.00
4.2741	5.4928	35.372	45.139	1.0906	44.048	136.44	470.00
5.4928	6.1390	42.899	54.530	1.1493	53.381	136.61	480.00
6.1390	5.5016	52.163	63.804	1.2177	62.586	136.83	490.00
5.5016	4.2117	61.307	71.021	1.2792	69.741	137.03	500.00
4.2117	3.5791	68.424	76.214	1.3178	74.897	137.17	510.00
3.5791	3.1862	73.552	80.317	1.3449	78.972	137.26	520.00
3.1862	2.9163	77.606	83.709	1.3660	82.343	137.34	530.00
2.9163	2.7867	80.959	86.662	1.3832	85.279	137.40	540.00
2.7867	2.5141	83.881	89.182	1.3980	87.784	137.46	550.00
2.5141	2.1695	86.373	91.057	1.4105	89.647	137.50	560.00
2.1695	2.0007	88.227	92.397	1.4197	90.977	137.54	570.00
2.0007	1.9238	89.551	93.476	1.4263	92.049	137.56	580.00
1.9238	1.8824	90.618	94.424	1.4315	92.993	137.58	590.00
1.8824	1.8634	91.556	95.302	1.4362	93.866	137.60	600.00
1.8634	1.8147	92.426	96.104	1.4404	94.663	137.62	610.00
1.8147	1.7511	93.219	96.785	1.4443	95.341	137.63	620.00
1.7511	1.7209	93.893	97.365	1.4475	95.918	137.65	630.00
1.7209	1.7020	94.467	97.890	1.4503	96.440	137.66	640.00
1.7020	1.6989	94.987	98.388	1.4529	96.935	137.67	650.00
1.6989	1.6985	95.480	98.877	1.4553	97.422	137.68	660.00
1.6985	1.6120	95.964	99.275	1.4576	97.817	137.68	670.00
1.6120	1.4825	96.358	99.452	1.4595	97.993	137.69	680.00
1.4825	1.4191	96.532	99.434	1.4604	97.974	137.70	690.00
1.4191	1.3936	96.513	99.326	1.4603	97.866	137.69	700.00
1.3936	1.3764	96.406	99.176	1.4598	97.716	137.69	710.00
1.3764	1.3686	96.257	99.002	1.4590	97.543	137.69	720.00
1.3686	1.3705	96.085	98.824	1.4582	97.366	137.69	730.00
1.3705	1.3669	95.908	98.646	1.4573	97.189	137.68	740.00
1.3669	1.3658	95.732	98.465	1.4565	97.008	137.68	750.00
1.3658	1.3710	95.553	98.289	1.4556	96.834	137.68	760.00
1.3710	1.3690	95.379	98.119	1.4548	96.664	137.67	770.00
1.3690	1.3686	95.210	97.948	1.4539	96.494	137.67	780.00
1.3686	1.2857	95.041	97.695	1.4531	96.242	137.67	790.00
1.2857	1.1567	94.790	97.233	1.4519	95.781	137.66	800.00
1.1567	1.0932	94.331	96.581	1.4497	95.131	137.65	810.00
1.0932	1.0620	93.685	95.840	1.4465	94.393	137.64	820.00
1.0620	1.0469	92.950	95.059	1.4430	93.616	137.63	830.00
1.0469	1.0398	92.177	94.264	1.4392	92.825	137.61	840.00
1.0398	1.0783	91.389	93.507	1.4354	92.072	137.60	850.00
1.0783	1.1447	90.640	92.863	1.4317	91.432	137.58	860.00
1.1447	1.1780	90.003	92.326	1.4285	90.897	137.57	870.00
1.1780	1.1896	89.472	91.839	1.4259	90.413	137.56	880.00
1.1896	1.2010	88.990	91.380	1.4235	89.957	137.55	890.00
1.2010	1.2070	88.536	90.944	1.4212	89.523	137.54	900.00
1.2070	1.2052	88.103	90.516	1.4191	89.097	137.54	910.00
1.2052	1.2099	87.680	90.095	1.4170	88.678	137.53	920.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.2099	1.2126	87.263	89.685	1.4149	88.270	137.52	930.00
1.2126	1.2090	86.857	89.279	1.4129	87.866	137.51	940.00
1.2090	1.2129	86.455	88.877	1.4109	87.466	137.51	950.00
1.2129	1.2152	86.057	88.485	1.4090	87.076	137.50	960.00
1.2152	1.0799	85.669	87.964	1.4070	86.557	137.49	970.00
1.0799	0.8869	85.153	87.120	1.4044	85.715	137.48	980.00
0.8869	0.7915	84.315	85.994	1.4002	84.593	137.47	990.00
0.7915	0.7392	83.199	84.730	1.3945	83.335	137.44	1000.00
0.7392	0.7186	81.947	83.405	1.3882	82.016	137.42	1010.00
0.7186	0.7085	80.635	82.062	1.3816	80.680	137.40	1020.00
0.7085	0.7880	79.306	80.802	1.3747	79.427	137.37	1030.00
0.7880	0.9171	78.059	79.764	1.3683	78.396	137.35	1040.00
0.9171	0.9812	77.033	78.931	1.3630	77.568	137.33	1050.00
0.9812	1.0132	76.209	78.203	1.3588	76.845	137.31	1060.00
1.0132	1.0293	75.489	77.532	1.3551	76.177	137.30	1070.00
1.0293	1.0375	74.825	76.892	1.3516	75.540	137.29	1080.00
1.0375	0.9995	74.192	76.229	1.3483	74.881	137.28	1090.00
0.9995	0.9333	73.536	75.469	1.3449	74.124	137.26	1100.00
0.9333	0.9008	72.783	74.617	1.3409	73.276	137.25	1110.00
0.9008	1.0488	71.940	73.889	1.3365	72.553	137.23	1120.00
1.0488	0.9582	71.220	73.227	1.3327	71.894	137.22	1130.00
0.9582	0.7548	70.565	72.278	1.3293	70.949	137.21	1140.00
0.7548	0.8183	69.625	71.198	1.3242	69.874	137.19	1150.00
0.8183	0.8446	68.555	70.218	1.3185	68.899	137.17	1160.00
0.8446	0.8577	67.586	69.288	1.3133	67.975	137.15	1170.00
0.8577	0.8697	66.667	68.394	1.3084	67.086	137.13	1180.00
0.8697	0.8705	65.782	67.522	1.3036	66.219	137.12	1190.00
0.8705	0.8710	64.920	66.661	1.2990	65.362	137.10	1200.00
0.8710	0.8767	64.068	65.816	1.2943	64.521	137.09	1210.00
0.8767	0.8744	63.231	64.983	1.2898	63.693	137.07	1220.00
0.8744	0.8734	62.408	64.155	1.2852	62.870	137.05	1230.00
0.8734	0.8783	61.589	63.341	1.2808	62.060	137.04	1240.00
0.8783	0.8756	60.784	62.538	1.2763	61.262	137.02	1250.00
0.8756	0.8744	59.990	61.740	1.2720	60.468	137.01	1260.00
0.8744	0.8793	59.200	60.954	1.2672	59.687	136.99	1270.00
0.8793	0.8765	58.425	60.181	1.2618	58.919	136.97	1280.00
0.8765	0.8753	57.663	59.415	1.2565	58.158	136.96	1290.00
0.8753	0.8801	56.907	58.662	1.2512	57.411	136.94	1300.00
0.8801	0.8773	56.165	57.923	1.2460	56.677	136.92	1310.00
0.8773	0.8761	55.436	57.189	1.2410	55.948	136.90	1320.00
0.8761	0.8330	54.712	56.421	1.2358	55.185	136.89	1330.00
0.8330	0.7692	53.955	55.557	1.2304	54.327	136.87	1340.00
0.7692	0.7377	53.102	54.609	1.2243	53.385	136.85	1350.00
0.7377	0.7168	52.167	53.622	1.2177	52.404	136.83	1360.00
0.7168	0.7119	51.193	52.622	1.2107	51.411	136.81	1370.00
0.7119	0.7096	50.208	51.629	1.2036	50.426	136.78	1380.00
0.7096	0.7032	49.229	50.642	1.1964	49.446	136.76	1390.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.7032	0.7054	48.256	49.665	1.1893	48.476	136.74	1400.00
0.7054	0.7066	47.293	48.705	1.1822	47.523	136.71	1410.00
0.7066	0.7019	46.348	47.756	1.1753	46.581	136.69	1420.00
0.7019	0.7050	45.413	46.820	1.1682	45.651	136.67	1430.00
0.7050	0.7066	44.490	45.902	1.1613	44.741	136.65	1440.00
0.7066	0.5260	43.586	44.819	1.1545	43.664	136.63	1450.00
0.5260	0.2604	42.518	43.304	1.1465	42.158	136.60	1460.00
0.2604	0.1289	41.023	41.412	1.1349	40.277	136.57	1470.00
0.1289	0.0638	39.157	39.349	1.1205	38.229	136.53	1480.00
0.0638	0.0316	37.124	37.220	1.1046	36.115	136.48	1490.00
0.0316	0.0156	35.027	35.074	1.0878	33.987	136.43	1500.00
0.0156	0.0077	32.916	32.939	1.0708	31.868	136.38	1510.00
0.0077	0.0038	30.815	30.826	1.0535	29.773	136.33	1520.00
0.0038	0.0019	28.737	28.743	1.0362	27.706	136.28	1530.00
0.0019	0.0009	26.688	26.691	1.0187	25.672	136.23	1540.00
0.0009	0.0005	24.671	24.672	1.0013	23.671	136.19	1550.00
0.0005	0.0002	22.687	22.688	0.9838	21.704	136.14	1560.00
0.0002	0.0001	20.737	20.738	0.9665	19.771	136.10	1570.00
0.0001	0.0001	18.822	18.823	0.9488	17.874	136.05	1580.00
0.0001	0.0000	16.942	16.942	0.9315	16.011	136.01	1590.00
0.0000	0.0000	15.100	15.100	0.9105	14.190	135.96	1600.00
0.0000	0.0000	13.301	13.301	0.8890	12.412	135.90	1610.00
0.0000	0.0000	11.545	11.545	0.8671	10.678	135.85	1620.00
0.0000	0.0000	9.8320	9.8320	0.8457	8.9864	135.80	1630.00
0.0000	0.0000	8.1626	8.1626	0.8237	7.3389	135.76	1640.00
0.0000	0.0000	6.5366	6.5366	0.8023	5.7343	135.71	1650.00
0.0000	0.0000	4.9539	4.9539	0.7804	4.1735	135.66	1660.00
0.0000	0.0000	3.4147	3.4147	0.7589	2.6558	135.62	1670.00
0.0000	0.0000	1.9219	1.9219	0.7340	1.1879	135.57	1680.00
0.0000	0.0000	0.4809	0.4809	0.7070	-0.2262	135.52	1690.00

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ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 134.85
Elev: 134.85 ft Orifice Diameter: 5.6484 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
134.85	0.0000	0.0000	0.0000	136.90	16574	1.2396	56.487	139.00	52955	1.7638	178.28
134.90	0.0000	0.1936	0.1936	137.00	17862	1.2695	60.810	139.10	53960	1.7849	181.65
135.00	0.0000	0.3353	0.3353	137.10	19459	1.2987	66.161	139.20	54964	1.8058	185.02
135.10	0.0000	0.4329	0.4329	137.20	21055	1.3272	71.511	139.30	55969	1.8264	188.39
135.20	0.0000	0.5122	0.5122	137.30	22652	1.3552	76.861	139.40	56973	1.8468	191.76
135.30	0.0000	0.5808	0.5808	137.40	24248	1.3826	82.211	139.50	57978	1.8670	195.13
135.40	0.0000	0.6421	0.6421	137.50	25845	1.4094	87.559	139.60	58982	1.8870	198.49
135.50	0.0000	0.6980	0.6980	137.60	27442	1.4358	92.908	139.70	59987	1.9067	201.86
135.60	830.50	0.7498	3.5181	137.70	29038	1.4616	98.256	139.80	60991	1.9263	205.23
135.70	1869	0.7982	7.0270	137.80	30635	1.4871	103.60	139.90	61996	1.9456	208.60
135.80	2907	0.8439	10.533	137.90	32231	1.5121	108.95	140.00	63000	1.9648	211.96
135.90	3945	0.8872	14.037	138.00	33828	1.5366	114.30	140.10	64500	1.9838	216.98
136.00	4983	0.9285	17.538	138.10	35741	1.5608	120.70	140.20	66000	2.0026	222.00
136.10	6271	0.9680	21.871	138.20	37653	1.5847	127.10	140.30	67500	2.0212	227.02
136.20	7559	1.0060	26.202	138.30	39566	1.6082	133.50	140.40	69000	2.0397	232.04
136.30	8847	1.0426	30.532	138.40	41479	1.6313	139.89	140.50	70500	2.0580	237.06
136.40	10135	1.0779	34.860	138.50	43392	1.6541	146.29	140.60	72000	2.0761	242.08
136.50	11423	1.1121	39.187	138.60	45304	1.6766	152.69	140.70	73500	2.0941	247.09
136.60	12710	1.1453	43.513	138.70	47217	1.6988	159.09	140.80	75000	2.1119	252.11
136.70	13998	1.1776	47.839	138.80	49130	1.7207	165.49	140.90	76500	2.1296	257.13
136.80	15286	1.2090	52.163	138.90	51042	1.7424	171.88				

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 3.12 INFLOW Q (cfs): 8.82
 PEAK STAGE (ft): 138.98 PEAK OUTFLOW : 1.76
 PEAK TIME: 800.00 min.
 INFLOW HYD No. : 6 OUTFLOW HYD No.: 11

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE (ft)	TIME (min)
<----- cfs min ----->							
0.0000	0.0023	0.0000	0.0023	0.0000	0.0023	134.85	40.00
0.0023	0.0255	0.0000	0.0278	0.0023	0.0255	134.85	50.00
0.0255	0.0753	0.0000	0.1008	0.0255	0.0753	134.85	60.00
0.0753	0.1703	0.0000	0.2456	0.0753	0.1703	134.85	70.00
0.1703	0.2994	0.0000	0.4697	0.1703	0.2994	135.50	80.00
0.2994	0.4187	0.0000	0.7181	0.2994	0.4187	135.50	90.00
0.4187	0.5234	0.0000	0.9421	0.4187	0.5234	135.50	100.00
0.5234	0.6131	0.0000	1.1365	0.5234	0.6131	135.50	110.00
0.6131	0.6895	0.0000	1.3026	0.6131	0.6895	135.50	120.00
0.6895	0.7895	0.0000	1.4789	0.6895	0.7895	135.50	130.00
0.7895	0.9053	0.0898	1.7845	0.6997	1.0848	135.50	140.00
0.9053	0.9889	0.3797	2.2739	0.7051	1.5688	135.51	150.00
0.9889	1.0481	0.8548	2.8918	0.7140	2.1778	135.53	160.00
1.0481	1.1016	1.4526	3.6024	0.7252	2.8772	135.55	170.00
1.1016	1.1447	2.1391	4.3854	0.7380	3.6474	135.58	180.00
1.1447	1.1754	2.8958	5.2158	0.7516	4.4642	135.60	190.00
1.1754	1.2085	3.7014	6.0852	0.7629	5.3224	135.63	200.00
1.2085	1.2361	4.5477	6.9923	0.7747	6.2176	135.65	210.00
1.2361	1.2542	5.4306	7.9208	0.7871	7.1338	135.68	220.00
1.2542	1.2775	6.3342	8.8659	0.7996	8.0662	135.70	230.00
1.2775	1.2969	7.2545	9.8289	0.8118	9.0171	135.73	240.00
1.2969	1.3600	8.1930	10.850	0.8241	10.026	135.76	250.00
1.3600	1.4449	9.1885	11.993	0.8373	11.156	135.79	260.00
1.4449	1.4942	10.305	13.244	0.8516	12.392	135.82	270.00
1.4942	1.5311	11.525	14.551	0.8669	13.684	135.85	280.00
1.5311	1.5505	12.801	15.882	0.8828	15.000	135.89	290.00
1.5505	1.5680	14.101	17.220	0.8985	16.321	135.93	300.00
1.5680	1.7930	15.407	18.768	0.9141	17.854	135.97	310.00
1.7930	2.1184	16.922	20.834	0.9313	19.903	136.01	320.00
2.1184	2.2939	18.953	23.365	0.9500	22.415	136.05	330.00
2.2939	2.3939	21.442	26.130	0.9728	25.157	136.11	340.00
2.3939	2.4554	24.160	29.009	0.9968	28.013	136.18	350.00
2.4554	2.4969	26.991	31.944	1.0213	30.922	136.24	360.00
2.4969	2.4756	29.877	34.849	1.0458	33.803	136.31	370.00
2.4756	2.4218	32.734	37.631	1.0693	36.562	136.38	380.00
2.4218	2.3962	35.471	40.289	1.0914	39.197	136.44	390.00
2.3962	2.3906	38.085	42.872	1.1122	41.760	136.50	400.00
2.3906	2.4010	40.628	45.419	1.1319	44.288	136.56	410.00
2.4010	2.4058	43.136	47.943	1.1511	46.792	136.62	420.00
2.4058	3.1411	45.622	51.169	1.1698	49.999	136.68	430.00
3.1411	4.2539	48.806	56.201	1.1933	55.008	136.75	440.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
4.2539	4.8282	53.779	62.861	1.2292	61.631	136.87	450.00
4.8282	6.1720	60.357	71.358	1.2740	70.084	137.02	460.00
6.1720	7.9120	68.764	82.848	1.3196	81.528	137.17	470.00
7.9120	8.8222	80.149	96.884	1.3791	95.504	137.39	480.00
8.8222	7.8936	94.056	110.77	1.4483	109.32	137.65	490.00
7.8936	6.0356	107.81	121.74	1.5138	120.23	137.91	500.00
6.0356	5.1224	118.67	129.82	1.5591	128.27	138.09	510.00
5.1224	4.5550	126.68	136.35	1.5890	134.76	138.22	520.00
4.5550	4.1650	133.15	141.87	1.6127	140.26	138.32	530.00
4.1650	3.9765	138.63	146.77	1.6326	145.14	138.41	540.00
3.9765	3.5852	143.49	151.05	1.6500	149.40	138.48	550.00
3.5852	3.0921	147.73	154.41	1.6650	152.74	138.55	560.00
3.0921	2.8499	151.07	157.01	1.6768	155.33	138.60	570.00
2.8499	2.7391	153.65	159.24	1.6858	157.55	138.64	580.00
2.7391	2.6789	155.86	161.27	1.6935	159.58	138.68	590.00
2.6789	2.6508	157.88	163.21	1.7005	161.51	138.71	600.00
2.6508	2.5806	159.80	165.03	1.7071	163.33	138.74	610.00
2.5806	2.4893	161.61	166.68	1.7133	164.97	138.77	620.00
2.4893	2.4454	163.25	168.19	1.7190	166.47	138.79	630.00
2.4454	2.4178	164.74	169.61	1.7241	167.88	138.82	640.00
2.4178	2.4127	166.15	170.98	1.7289	169.25	138.84	650.00
2.4127	2.4114	167.52	172.35	1.7335	170.61	138.86	660.00
2.4114	2.2879	168.87	173.57	1.7381	171.83	138.88	670.00
2.2879	2.1036	170.09	174.48	1.7422	172.74	138.90	680.00
2.1036	2.0131	171.00	175.11	1.7453	173.37	138.91	690.00
2.0131	1.9763	171.62	175.61	1.7474	173.86	138.92	700.00
1.9763	1.9516	172.11	176.04	1.7490	174.29	138.93	710.00
1.9516	1.9400	172.54	176.43	1.7504	174.68	138.94	720.00
1.9400	1.9423	172.93	176.81	1.7518	175.06	138.94	730.00
1.9423	1.9368	173.31	177.19	1.7530	175.44	138.95	740.00
1.9368	1.9348	173.68	177.55	1.7543	175.80	138.96	750.00
1.9348	1.9418	174.04	177.92	1.7555	176.16	138.96	760.00
1.9418	1.9386	174.41	178.29	1.7567	176.53	138.97	770.00
1.9386	1.9376	174.77	178.65	1.7579	176.89	138.97	780.00
1.9376	1.8200	175.13	178.89	1.7591	177.13	138.98	790.00
1.8200	1.6371	175.37	178.83	1.7599	177.07	138.98	800.00
1.6371	1.5469	175.31	178.49	1.7597	176.73	138.98	810.00
1.5469	1.5026	174.97	178.02	1.7586	176.26	138.98	820.00
1.5026	1.4810	174.51	177.49	1.7570	175.73	138.97	830.00
1.4810	1.4706	173.98	176.93	1.7553	175.17	138.96	840.00
1.4706	1.5249	173.42	176.42	1.7534	174.66	138.95	850.00
1.5249	1.6185	172.91	176.06	1.7517	174.30	138.94	860.00
1.6185	1.6653	172.55	175.84	1.7505	174.09	138.94	870.00
1.6653	1.6815	172.34	175.68	1.7498	173.93	138.93	880.00
1.6815	1.6974	172.18	175.56	1.7492	173.81	138.93	890.00
1.6974	1.7056	172.07	175.47	1.7488	173.72	138.93	900.00
1.7056	1.7027	171.97	175.38	1.7485	173.63	138.93	910.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.7027	1.7091	171.88	175.29	1.7482	173.55	138.93	920.00
1.7091	1.7127	171.80	175.22	1.7480	173.47	138.93	930.00
1.7127	1.7074	171.72	175.14	1.7477	173.40	138.92	940.00
1.7074	1.7126	171.65	175.07	1.7475	173.32	138.92	950.00
1.7126	1.7156	171.57	175.00	1.7472	173.26	138.92	960.00
1.7156	1.5244	171.51	174.75	1.7470	173.00	138.92	970.00
1.5244	1.2519	171.26	174.03	1.7461	172.29	138.92	980.00
1.2519	1.1171	170.54	172.91	1.7437	171.17	138.91	990.00
1.1171	1.0431	169.43	171.59	1.7400	169.85	138.89	1000.00
1.0431	1.0140	168.11	170.17	1.7355	168.43	138.87	1010.00
1.0140	0.9997	166.70	168.72	1.7307	166.99	138.85	1020.00
0.9997	1.1117	165.26	167.37	1.7258	165.65	138.82	1030.00
1.1117	1.2937	163.92	166.33	1.7213	164.61	138.80	1040.00
1.2937	1.3840	162.89	165.57	1.7177	163.85	138.79	1050.00
1.3840	1.4290	162.14	164.95	1.7151	163.23	138.77	1060.00
1.4290	1.4515	161.52	164.40	1.7130	162.69	138.76	1070.00
1.4515	1.4629	160.98	163.89	1.7112	162.18	138.76	1080.00
1.4629	1.4092	160.47	163.34	1.7094	161.63	138.75	1090.00
1.4092	1.3158	159.93	162.65	1.7075	160.94	138.74	1100.00
1.3158	1.2697	159.24	161.82	1.7052	160.12	138.73	1110.00
1.2697	1.4782	158.42	161.16	1.7024	159.46	138.72	1120.00
1.4782	1.3504	157.76	160.59	1.7001	158.89	138.71	1130.00
1.3504	1.0637	157.19	159.61	1.6981	157.91	138.70	1140.00
1.0637	1.1531	156.21	158.43	1.6947	156.74	138.68	1150.00
1.1531	1.1900	155.04	157.39	1.6907	155.70	138.66	1160.00
1.1900	1.2084	154.01	156.41	1.6871	154.72	138.65	1170.00
1.2084	1.2252	153.04	155.47	1.6837	153.79	138.63	1180.00
1.2252	1.2261	152.11	154.56	1.6804	152.88	138.62	1190.00
1.2261	1.2268	151.20	153.65	1.6773	151.98	138.60	1200.00
1.2268	1.2347	150.30	152.76	1.6741	151.09	138.59	1210.00
1.2347	1.2313	149.42	151.88	1.6710	150.21	138.57	1220.00
1.2313	1.2298	148.55	151.01	1.6679	149.34	138.56	1230.00
1.2298	1.2367	147.67	150.14	1.6648	148.48	138.55	1240.00
1.2367	1.2328	146.81	149.28	1.6618	147.62	138.53	1250.00
1.2328	1.2310	145.96	148.43	1.6588	146.77	138.52	1260.00
1.2310	1.2377	145.11	147.58	1.6558	145.93	138.51	1270.00
1.2377	1.2337	144.27	146.74	1.6528	145.09	138.49	1280.00
1.2337	1.2319	143.44	145.91	1.6498	144.26	138.48	1290.00
1.2319	1.2386	142.61	145.08	1.6469	143.43	138.47	1300.00
1.2386	1.2346	141.79	144.26	1.6439	142.62	138.46	1310.00
1.2346	1.2327	140.98	143.45	1.6410	141.80	138.44	1320.00
1.2327	1.1720	140.17	142.57	1.6381	140.93	138.43	1330.00
1.1720	1.0821	139.30	141.55	1.6350	139.92	138.42	1340.00
1.0821	1.0377	138.29	140.41	1.6314	138.77	138.40	1350.00
1.0377	1.0083	137.15	139.19	1.6272	137.57	138.38	1360.00
1.0083	1.0014	135.94	137.95	1.6229	136.33	138.36	1370.00
1.0014	0.9980	134.71	136.71	1.6184	135.09	138.34	1380.00

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LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.9980	0.9889	133.48	135.46	1.6139	133.85	138.32	1390.00
0.9889	0.9920	132.24	134.22	1.6094	132.61	138.31	1400.00
0.9920	0.9936	131.01	132.99	1.6049	131.39	138.29	1410.00
0.9936	0.9870	129.79	131.77	1.6004	130.17	138.27	1420.00
0.9870	0.9913	128.57	130.55	1.5960	128.95	138.25	1430.00
0.9913	0.9935	127.36	129.35	1.5915	127.76	138.23	1440.00
0.9935	0.7395	126.17	127.90	1.5871	126.32	138.21	1450.00
0.7395	0.3661	124.73	125.84	1.5818	124.26	138.19	1460.00
0.3661	0.1812	122.68	123.23	1.5741	121.66	138.16	1470.00
0.1812	0.0897	120.09	120.36	1.5644	118.80	138.12	1480.00
0.0897	0.0444	117.24	117.38	1.5537	115.83	138.07	1490.00
0.0444	0.0220	114.28	114.35	1.5424	112.81	138.02	1500.00
0.0220	0.0109	111.28	111.31	1.5298	109.78	137.97	1510.00
0.0109	0.0054	108.26	108.28	1.5159	106.76	137.92	1520.00
0.0054	0.0027	105.26	105.27	1.5018	103.77	137.86	1530.00
0.0027	0.0013	102.28	102.29	1.4878	100.80	137.80	1540.00
0.0013	0.0007	99.324	99.326	1.4737	97.852	137.75	1550.00
0.0007	0.0003	96.392	96.393	1.4597	94.934	137.69	1560.00
0.0003	0.0002	93.488	93.488	1.4456	92.043	137.64	1570.00
0.0002	0.0001	90.611	90.612	1.4315	89.180	137.58	1580.00
0.0001	0.0000	87.763	87.763	1.4174	86.345	137.53	1590.00
0.0000	0.0000	84.942	84.942	1.4033	83.539	137.48	1600.00
0.0000	0.0000	82.150	82.150	1.3892	80.760	137.42	1610.00
0.0000	0.0000	79.385	79.385	1.3752	78.010	137.37	1620.00
0.0000	0.0000	76.649	76.649	1.3611	75.288	137.32	1630.00
0.0000	0.0000	73.941	73.941	1.3470	72.594	137.27	1640.00
0.0000	0.0000	71.261	71.261	1.3329	69.928	137.22	1650.00
0.0000	0.0000	68.609	68.609	1.3188	67.291	137.17	1660.00
0.0000	0.0000	65.986	65.986	1.3047	64.681	137.12	1670.00
0.0000	0.0000	63.390	63.390	1.2906	62.100	137.07	1680.00
0.0000	0.0000	60.823	60.823	1.2766	59.547	137.02	1690.00
0.0000	0.0000	58.286	58.286	1.2608	57.025	136.97	1700.00
0.0000	0.0000	55.782	55.782	1.2434	54.538	136.91	1710.00
0.0000	0.0000	53.313	53.313	1.2258	52.087	136.85	1720.00
0.0000	0.0000	50.878	50.878	1.2085	49.670	136.80	1730.00
0.0000	0.0000	48.479	48.479	1.1909	47.288	136.74	1740.00
0.0000	0.0000	46.114	46.114	1.1735	44.941	136.69	1750.00
0.0000	0.0000	43.785	43.785	1.1560	42.629	136.63	1760.00
0.0000	0.0000	41.490	41.490	1.1386	40.352	136.58	1770.00
0.0000	0.0000	39.231	39.231	1.1211	38.110	136.53	1780.00
0.0000	0.0000	37.006	37.006	1.1036	35.902	136.48	1790.00
0.0000	0.0000	34.816	34.816	1.0862	33.730	136.42	1800.00
0.0000	0.0000	32.661	32.661	1.0687	31.593	136.37	1810.00
0.0000	0.0000	30.541	30.541	1.0512	29.490	136.32	1820.00
0.0000	0.0000	28.456	28.456	1.0338	27.423	136.28	1830.00
0.0000	0.0000	26.406	26.406	1.0163	25.390	136.23	1840.00
0.0000	0.0000	24.391	24.391	0.9989	23.392	136.18	1850.00

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0000	22.411	22.411	0.9813	21.430	136.14	1860.00
0.0000	0.0000	20.466	20.466	0.9640	19.502	136.09	1870.00
0.0000	0.0000	18.555	18.555	0.9464	17.609	136.05	1880.00
0.0000	0.0000	16.680	16.680	0.9291	15.751	136.00	1890.00
0.0000	0.0000	14.843	14.843	0.9074	13.936	135.95	1900.00
0.0000	0.0000	13.050	13.050	0.8859	12.164	135.90	1910.00
0.0000	0.0000	11.300	11.300	0.8640	10.436	135.85	1920.00
0.0000	0.0000	9.5935	9.5935	0.8426	8.7509	135.80	1930.00
0.0000	0.0000	7.9302	7.9302	0.8207	7.1095	135.75	1940.00
0.0000	0.0000	6.3102	6.3102	0.7993	5.5109	135.70	1950.00
0.0000	0.0000	4.7336	4.7336	0.7773	3.9563	135.66	1960.00
0.0000	0.0000	3.2004	3.2004	0.7559	2.4446	135.61	1970.00
0.0000	0.0000	1.7145	1.7145	0.7301	0.9844	135.56	1980.00
0.0000	0.0000	0.2811	0.2811	0.7033	-0.4222	135.51	1990.00

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ROUTING REPORT

STORAGE LIST ID No. A
Description:

MULTIPLE ORIFICE ID No. A
Description:
Outlet Elev: 134.85
Elev: 134.85 ft Orifice Diameter: 5.6484 in.

ROUTING CURVE

STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S	STAGE	STORAGE	OUTFLOW	O+2S
(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min	(ft)	(cf)	(cfs)	cfs-min
134.85	0.0000	0.0000	0.0000	136.90	16574	1.2396	56.487	139.00	52955	1.7638	178.28
134.90	0.0000	0.1936	0.1936	137.00	17862	1.2695	60.810	139.10	53960	1.7849	181.65
135.00	0.0000	0.3353	0.3353	137.10	19459	1.2987	66.161	139.20	54964	1.8058	185.02
135.10	0.0000	0.4329	0.4329	137.20	21055	1.3272	71.511	139.30	55969	1.8264	188.39
135.20	0.0000	0.5122	0.5122	137.30	22652	1.3552	76.861	139.40	56973	1.8468	191.76
135.30	0.0000	0.5808	0.5808	137.40	24248	1.3826	82.211	139.50	57978	1.8670	195.13
135.40	0.0000	0.6421	0.6421	137.50	25845	1.4094	87.559	139.60	58982	1.8870	198.49
135.50	0.0000	0.6980	0.6980	137.60	27442	1.4358	92.908	139.70	59987	1.9067	201.86
135.60	830.50	0.7498	3.5181	137.70	29038	1.4616	98.256	139.80	60991	1.9263	205.23
135.70	1869	0.7982	7.0270	137.80	30635	1.4871	103.60	139.90	61996	1.9456	208.60
135.80	2907	0.8439	10.533	137.90	32231	1.5121	108.95	140.00	63000	1.9648	211.96
135.90	3945	0.8872	14.037	138.00	33828	1.5366	114.30	140.10	64500	1.9838	216.98
136.00	4983	0.9285	17.538	138.10	35741	1.5608	120.70	140.20	66000	2.0026	222.00
136.10	6271	0.9680	21.871	138.20	37653	1.5847	127.10	140.30	67500	2.0212	227.02
136.20	7559	1.0060	26.202	138.30	39566	1.6082	133.50	140.40	69000	2.0397	232.04
136.30	8847	1.0426	30.532	138.40	41479	1.6313	139.89	140.50	70500	2.0580	237.06
136.40	10135	1.0779	34.860	138.50	43392	1.6541	146.29	140.60	72000	2.0761	242.08
136.50	11423	1.1121	39.187	138.60	45304	1.6766	152.69	140.70	73500	2.0941	247.09
136.60	12710	1.1453	43.513	138.70	47217	1.6988	159.09	140.80	75000	2.1119	252.11
136.70	13998	1.1776	47.839	138.80	49130	1.7207	165.49	140.90	76500	2.1296	257.13
136.80	15286	1.2090	52.163	138.90	51042	1.7424	171.88				

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LEVEL POOL ROUTING TABLE

MATCH Q (cfs) : 4.00 INFLOW Q (cfs): 10.10
 PEAK STAGE (ft): 140.06 PEAK OUTFLOW : 1.98
 PEAK TIME: 800.00 min.
 INFLOW HYD No. : 7 OUTFLOW HYD No.: 12

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
0.0000	0.0108	0.0000	0.0108	0.0000	0.0108	134.85	40.00
0.0108	0.0546	0.0000	0.0654	0.0108	0.0546	135.50	50.00
0.0546	0.1252	0.0000	0.1798	0.0546	0.1252	135.50	60.00
0.1252	0.2471	0.0000	0.3723	0.1252	0.2471	135.50	70.00
0.2471	0.4071	0.0000	0.6542	0.2471	0.4071	135.50	80.00
0.4071	0.5481	0.0000	0.9552	0.4071	0.5481	135.50	90.00
0.5481	0.6678	0.0000	1.2158	0.5481	0.6678	135.50	100.00
0.6678	0.7681	0.0000	1.4358	0.6678	0.7681	135.50	110.00
0.7681	0.8518	0.0687	1.6886	0.6993	0.9893	135.50	120.00
0.8518	0.9641	0.2859	2.1019	0.7034	1.3985	135.51	130.00
0.9641	1.0953	0.6876	2.7470	0.7109	2.0362	135.52	140.00
1.0953	1.1875	1.3136	3.5963	0.7226	2.8737	135.55	150.00
1.1875	1.2507	2.1358	4.5739	0.7380	3.8359	135.58	160.00
1.2507	1.3074	3.0818	5.6399	0.7542	4.8857	135.61	170.00
1.3074	1.3523	4.1170	6.7767	0.7687	6.0081	135.64	180.00
1.3523	1.3831	5.2239	7.9594	0.7842	7.1752	135.67	190.00
1.3831	1.4173	6.3750	9.1755	0.8002	8.3753	135.70	200.00
1.4173	1.4453	7.5595	10.422	0.8158	9.6063	135.74	210.00
1.4453	1.4626	8.7745	11.682	0.8318	10.851	135.77	220.00
1.4626	1.4863	10.003	12.952	0.8478	12.104	135.81	230.00
1.4863	1.5058	11.241	14.233	0.8633	13.370	135.84	240.00
1.5058	1.5760	12.491	15.572	0.8789	14.693	135.88	250.00
1.5760	1.6719	13.799	17.046	0.8949	16.152	135.92	260.00
1.6719	1.7289	15.239	18.640	0.9121	17.728	135.96	270.00
1.7289	1.7740	16.798	20.301	0.9302	19.371	136.00	280.00
1.7740	1.7986	18.425	21.998	0.9452	21.053	136.04	290.00
1.7986	1.8195	20.092	23.710	0.9605	22.750	136.08	300.00
1.8195	2.0796	21.774	25.673	0.9757	24.698	136.12	310.00
2.0796	2.4549	23.705	28.239	0.9928	27.246	136.17	320.00
2.4549	2.6557	26.232	31.342	1.0148	30.327	136.22	330.00
2.6557	2.7687	29.286	34.711	1.0408	33.670	136.30	340.00
2.7687	2.8373	32.602	38.208	1.0682	37.140	136.37	350.00
2.8373	2.8828	36.044	41.764	1.0959	40.668	136.45	360.00
2.8828	2.8561	39.544	45.283	1.1235	44.160	136.53	370.00
2.8561	2.7921	43.009	48.658	1.1502	47.507	136.61	380.00
2.7921	2.7608	46.332	51.885	1.1751	50.710	136.69	390.00
2.7608	2.7527	49.512	55.025	1.1985	53.827	136.77	400.00
2.7527	2.7632	52.606	58.122	1.2208	56.901	136.84	410.00
2.7632	2.7674	55.658	61.189	1.2425	59.947	136.91	420.00
2.7674	3.6107	58.683	65.061	1.2636	63.798	136.98	430.00
3.6107	4.8868	62.512	71.009	1.2858	69.723	137.06	440.00

NOVELLUS

LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
4.8868	5.5430	68.406	78.835	1.3177	77.518	137.17	450.00
5.5430	7.0799	76.159	88.782	1.3586	87.424	137.31	460.00
7.0799	9.0687	86.015	102.16	1.4087	100.75	137.50	470.00
9.0687	10.104	99.281	118.45	1.4735	116.98	137.75	480.00
10.104	9.0361	115.43	134.57	1.5468	133.03	138.04	490.00
9.0361	6.9063	131.42	147.36	1.6064	145.76	138.29	500.00
6.9063	5.8589	144.10	156.87	1.6522	155.22	138.49	510.00
5.8589	5.2080	153.53	164.60	1.6854	162.91	138.64	520.00
5.2080	4.7606	161.20	171.17	1.7119	169.46	138.76	530.00
4.7606	4.5438	167.72	177.03	1.7342	175.29	138.86	540.00
4.5438	4.0957	173.54	182.18	1.7538	180.43	138.95	550.00
4.0957	3.5317	178.65	186.28	1.7772	184.50	139.06	560.00
3.5317	3.2545	182.70	189.48	1.8026	187.68	139.18	570.00
3.2545	3.1274	185.86	192.24	1.8221	190.42	139.28	580.00
3.1274	3.0582	188.58	194.77	1.8387	192.93	139.36	590.00
3.0582	3.0257	191.07	197.16	1.8538	195.30	139.43	600.00
3.0257	2.9452	193.43	199.41	1.8681	197.54	139.51	610.00
2.9452	2.8406	195.66	201.44	1.8813	199.56	139.57	620.00
2.8406	2.7903	197.67	203.30	1.8932	201.41	139.63	630.00
2.7903	2.7584	199.50	205.05	1.9041	203.15	139.69	640.00
2.7584	2.7522	201.23	206.74	1.9142	204.83	139.74	650.00
2.7522	2.7505	202.90	208.41	1.9240	206.48	139.79	660.00
2.7505	2.6094	204.55	209.91	1.9335	207.98	139.84	670.00
2.6094	2.3990	206.03	211.04	1.9421	209.10	139.88	680.00
2.3990	2.2956	207.15	211.85	1.9485	209.90	139.91	690.00
2.2956	2.2535	207.94	212.49	1.9530	210.54	139.94	700.00
2.2535	2.2251	208.58	213.06	1.9567	211.11	139.96	710.00
2.2251	2.2117	209.15	213.58	1.9599	211.62	139.97	720.00
2.2117	2.2142	209.66	214.09	1.9629	212.12	139.99	730.00
2.2142	2.2077	210.16	214.58	1.9654	212.61	140.00	740.00
2.2077	2.2052	210.65	215.06	1.9673	213.09	140.01	750.00
2.2052	2.2130	211.12	215.54	1.9691	213.57	140.02	760.00
2.2130	2.2092	211.60	216.02	1.9709	214.05	140.03	770.00
2.2092	2.2080	212.08	216.50	1.9727	214.52	140.04	780.00
2.2080	2.0738	212.55	216.83	1.9745	214.86	140.05	790.00
2.0738	1.8653	212.88	216.82	1.9758	214.84	140.06	800.00
1.8653	1.7624	212.87	216.50	1.9757	214.52	140.06	810.00
1.7624	1.7118	212.55	216.02	1.9745	214.05	140.05	820.00
1.7118	1.6871	212.07	215.47	1.9727	213.50	140.04	830.00
1.6871	1.6753	211.53	214.89	1.9706	212.92	140.03	840.00
1.6753	1.7370	210.95	214.36	1.9684	212.40	140.02	850.00
1.7370	1.8436	210.43	214.01	1.9664	212.04	140.01	860.00
1.8436	1.8968	210.08	213.82	1.9651	211.85	140.00	870.00
1.8968	1.9151	209.89	213.70	1.9642	211.74	140.00	880.00
1.9151	1.9331	209.77	213.62	1.9635	211.66	139.99	890.00
1.9331	1.9424	209.70	213.57	1.9631	211.61	139.99	900.00
1.9424	1.9390	209.65	213.53	1.9628	211.56	139.99	910.00

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->			----->		(ft)	(min)	
=====							
1.9390	1.9461	209.60	213.49	1.9625	211.52	139.99	920.00
1.9461	1.9501	209.56	213.46	1.9623	211.50	139.99	930.00
1.9501	1.9440	209.53	213.43	1.9621	211.46	139.99	940.00
1.9440	1.9498	209.50	213.40	1.9620	211.43	139.99	950.00
1.9498	1.9531	209.47	213.38	1.9618	211.41	139.98	960.00
1.9531	1.7354	209.45	213.14	1.9617	211.18	139.98	970.00
1.7354	1.4251	209.22	212.38	1.9603	210.42	139.98	980.00
1.4251	1.2717	208.46	211.16	1.9560	209.20	139.95	990.00
1.2717	1.1873	207.25	209.71	1.9491	207.76	139.92	1000.00
1.1873	1.1542	205.82	208.17	1.9409	206.22	139.88	1010.00
1.1542	1.1379	204.29	206.58	1.9320	204.65	139.83	1020.00
1.1379	1.2653	202.73	205.13	1.9229	203.21	139.78	1030.00
1.2653	1.4723	201.30	204.03	1.9146	202.12	139.74	1040.00
1.4723	1.5751	200.21	203.26	1.9082	201.35	139.71	1050.00
1.5751	1.6262	199.45	202.65	1.9037	200.74	139.68	1060.00
1.6262	1.6518	198.84	202.12	1.9002	200.22	139.67	1070.00
1.6518	1.6647	198.32	201.64	1.8971	199.74	139.65	1080.00
1.6647	1.6036	197.85	201.12	1.8943	199.22	139.64	1090.00
1.6036	1.4972	197.33	200.43	1.8912	198.54	139.62	1100.00
1.4972	1.4448	196.65	199.60	1.8873	197.71	139.60	1110.00
1.4448	1.6818	195.83	198.95	1.8823	197.07	139.58	1120.00
1.6818	1.5365	195.19	198.41	1.8785	196.53	139.56	1130.00
1.5365	1.2102	194.66	197.40	1.8753	195.53	139.54	1140.00
1.2102	1.3118	193.66	196.18	1.8694	194.31	139.51	1150.00
1.3118	1.3538	192.45	195.11	1.8621	193.25	139.48	1160.00
1.3538	1.3747	191.40	194.13	1.8558	192.27	139.44	1170.00
1.3747	1.3937	190.42	193.19	1.8499	191.34	139.42	1180.00
1.3937	1.3948	189.49	192.28	1.8443	190.44	139.39	1190.00
1.3948	1.3955	188.60	191.39	1.8388	189.55	139.36	1200.00
1.3955	1.4045	187.72	190.52	1.8335	188.68	139.33	1210.00
1.4045	1.4006	186.86	189.66	1.8282	187.83	139.31	1220.00
1.4006	1.3988	186.01	188.81	1.8230	186.99	139.28	1230.00
1.3988	1.4066	185.17	187.97	1.8178	186.16	139.26	1240.00
1.4066	1.4021	184.34	187.15	1.8127	185.34	139.23	1250.00
1.4021	1.4000	183.53	186.33	1.8077	184.53	139.21	1260.00
1.4000	1.4076	182.72	185.53	1.8027	183.73	139.19	1270.00
1.4076	1.4030	181.93	184.74	1.7978	182.94	139.16	1280.00
1.4030	1.4009	181.15	183.95	1.7929	182.16	139.14	1290.00
1.4009	1.4085	180.37	183.18	1.7881	181.39	139.12	1300.00
1.4085	1.4039	179.61	182.42	1.7833	180.64	139.09	1310.00
1.4039	1.4017	178.86	181.67	1.7786	179.89	139.07	1320.00
1.4017	1.3327	178.11	180.85	1.7739	179.07	139.05	1330.00
1.3327	1.2304	177.31	179.87	1.7688	178.10	139.02	1340.00
1.2304	1.1799	176.34	178.75	1.7632	176.98	139.00	1350.00
1.1799	1.1465	175.23	177.55	1.7594	175.79	138.98	1360.00
1.1465	1.1385	174.04	176.32	1.7555	174.57	138.96	1370.00
1.1385	1.1347	172.81	175.09	1.7514	173.34	138.94	1380.00

NOVELLUS

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LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
1.1347	1.1243	171.59	173.85	1.7473	172.10	138.92	1390.00
1.1243	1.1278	170.36	172.61	1.7431	170.87	138.90	1400.00
1.1278	1.1296	169.13	171.39	1.7390	169.65	138.88	1410.00
1.1296	1.1221	167.91	170.16	1.7348	168.43	138.87	1420.00
1.1221	1.1270	166.70	168.95	1.7307	167.22	138.85	1430.00
1.1270	1.1295	165.49	167.75	1.7266	166.02	138.83	1440.00
1.1295	0.8407	164.30	166.27	1.7226	164.54	138.81	1450.00
0.8407	0.4162	162.83	164.08	1.7175	162.37	138.79	1460.00
0.4162	0.2060	160.66	161.28	1.7101	159.57	138.75	1470.00
0.2060	0.1020	157.87	158.18	1.7005	156.48	138.71	1480.00
0.1020	0.0505	154.79	154.94	1.6898	153.25	138.66	1490.00
0.0505	0.0250	151.57	151.65	1.6786	149.97	138.61	1500.00
0.0250	0.0124	148.30	148.34	1.6670	146.67	138.56	1510.00
0.0124	0.0061	145.01	145.03	1.6554	143.38	138.51	1520.00
0.0061	0.0030	141.73	141.74	1.6437	140.10	138.45	1530.00
0.0030	0.0015	138.47	138.47	1.6320	136.84	138.40	1540.00
0.0015	0.0007	135.22	135.22	1.6203	133.60	138.35	1550.00
0.0007	0.0004	131.99	131.99	1.6085	130.39	138.30	1560.00
0.0004	0.0002	128.79	128.79	1.5967	127.19	138.25	1570.00
0.0002	0.0001	125.61	125.61	1.5850	124.02	138.20	1580.00
0.0001	0.0000	122.45	122.45	1.5732	120.88	138.15	1590.00
0.0000	0.0000	119.32	119.32	1.5615	117.75	138.10	1600.00
0.0000	0.0000	116.20	116.20	1.5497	114.65	138.05	1610.00
0.0000	0.0000	113.12	113.12	1.5380	111.58	138.01	1620.00
0.0000	0.0000	110.05	110.05	1.5241	108.53	137.95	1630.00
0.0000	0.0000	107.02	107.02	1.5101	105.51	137.89	1640.00
0.0000	0.0000	104.01	104.01	1.4960	102.52	137.84	1650.00
0.0000	0.0000	101.04	101.04	1.4819	99.554	137.78	1660.00
0.0000	0.0000	98.086	98.086	1.4678	96.619	137.72	1670.00
0.0000	0.0000	95.165	95.165	1.4537	93.711	137.67	1680.00
0.0000	0.0000	92.271	92.271	1.4397	90.832	137.62	1690.00
0.0000	0.0000	89.406	89.406	1.4255	87.981	137.56	1700.00
0.0000	0.0000	86.569	86.569	1.4115	85.158	137.51	1710.00
0.0000	0.0000	83.760	83.760	1.3974	82.363	137.46	1720.00
0.0000	0.0000	80.980	80.980	1.3833	79.596	137.40	1730.00
0.0000	0.0000	78.227	78.227	1.3692	76.858	137.35	1740.00
0.0000	0.0000	75.503	75.503	1.3552	74.148	137.30	1750.00
0.0000	0.0000	72.807	72.807	1.3410	71.466	137.25	1760.00
0.0000	0.0000	70.138	70.138	1.3270	68.811	137.20	1770.00
0.0000	0.0000	67.499	67.499	1.3128	66.186	137.15	1780.00
0.0000	0.0000	64.887	64.887	1.2988	63.588	137.10	1790.00
0.0000	0.0000	62.303	62.303	1.2847	61.019	137.05	1800.00
0.0000	0.0000	59.748	59.748	1.2707	58.477	137.00	1810.00
0.0000	0.0000	57.224	57.224	1.2534	55.971	136.95	1820.00
0.0000	0.0000	54.735	54.735	1.2360	53.499	136.89	1830.00
0.0000	0.0000	52.280	52.280	1.2185	51.062	136.83	1840.00
0.0000	0.0000	49.861	49.861	1.2010	48.660	136.77	1850.00

NOVELLUS

=====

LEVEL POOL ROUTING TABLE

LEVEL POOL ROUTING TABLE

I1	I2	2S1	SUM	O1	O2+2S2	STAGE	TIME
<----- cfs min ----->						(ft)	(min)
=====							
0.0000	0.0000	47.476	47.476	1.1836	46.293	136.72	1860.00
0.0000	0.0000	45.126	45.126	1.1661	43.960	136.66	1870.00
0.0000	0.0000	42.812	42.812	1.1487	41.663	136.61	1880.00
0.0000	0.0000	40.532	40.532	1.1311	39.401	136.56	1890.00
0.0000	0.0000	38.287	38.287	1.1138	37.173	136.50	1900.00
0.0000	0.0000	36.077	36.077	1.0962	34.981	136.45	1910.00
0.0000	0.0000	33.902	33.902	1.0789	32.823	136.40	1920.00
0.0000	0.0000	31.762	31.762	1.0613	30.700	136.35	1930.00
0.0000	0.0000	29.656	29.656	1.0439	28.613	136.30	1940.00
0.0000	0.0000	27.586	27.586	1.0263	26.560	136.26	1950.00
0.0000	0.0000	25.551	25.551	1.0090	24.542	136.21	1960.00
0.0000	0.0000	23.550	23.550	0.9914	22.559	136.16	1970.00
0.0000	0.0000	21.585	21.585	0.9740	20.611	136.12	1980.00
0.0000	0.0000	19.654	19.654	0.9565	18.698	136.07	1990.00
0.0000	0.0000	17.759	17.759	0.9390	16.820	136.03	2000.00
0.0000	0.0000	15.900	15.900	0.9200	14.980	135.98	2010.00
0.0000	0.0000	14.082	14.082	0.8983	13.183	135.93	2020.00
0.0000	0.0000	12.307	12.307	0.8766	11.430	135.88	2030.00
0.0000	0.0000	10.575	10.575	0.8550	9.7201	135.83	2040.00
0.0000	0.0000	8.8868	8.8868	0.8333	8.0535	135.78	2050.00
0.0000	0.0000	7.2419	7.2419	0.8116	6.4303	135.73	2060.00
0.0000	0.0000	5.6403	5.6403	0.7900	4.8503	135.68	2070.00
0.0000	0.0000	4.0821	4.0821	0.7682	3.3139	135.64	2080.00
0.0000	0.0000	2.5678	2.5678	0.7461	1.8218	135.59	2090.00
0.0000	0.0000	1.1031	1.1031	0.7187	0.3845	135.54	2100.00
0.0000	0.0000	0.0000	0.0000	0.3845	-0.3845	135.50	2110.00

PIPES HAVE BEEN DESIGNED TO CONVEY
THE 25 YR STORM FOR EXISTING AND FUTURE
EXPANSION. FLOWS WERE GENERATED USING THE
SCS BASED SOFTWARE PROGRAM "WATERWORKS"

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
Tel: 503.224.9560 Net: info@grpmack.com Fax: 503.228.1285

By _____

Date _____

Job # _____

Sht. _____ of _____

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AREAS FOR PIPE SIZING - 'X'

ID	AREA (AC)	ID	AREA (AC)	ID	AREA (AC)
CB					
#1	0.26	#21	0.26	#42	0.21
#2	0.07	#22	0.10	#43	0.36
#3	0.05	#23	0.25	#44	0.07
#4	0.05	#24	0.25	#45	0.20
#5	0.24	#25	0.15	#46	0.25
#6	0.09	#26	0.19	#47	0.29
#7	0.08	#27	0.14	#48	0.26
#8	0.08	#28	0.10	#49	0.13
#9	0.10	#29	0.16	#50	0.18
#10	0.12	#30	0.17	#51	0.11
#11	0.11	#31	0.13	#52	0.18
#12	0.11	#32	0.03	#53	0.21
#13	0.11	#33	0.03	#54	0.12
#14	0.20	#34	0.06	#55	0.15
#15	0.21	#35	0.21	#56	0.03
#16	0.21	#36	0.12	#57	0.04
#17	0.11	#37	0.17	DITCH INLET	
#18	0.11	#38	0.19	#1	0.46
#19	0.06	#38A	0.12	#2	1.0
#20	0.06	#39	0.15	#3	0.28
#21		#40	0.36		
		#41	0.15		

GROUP

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By _____

Date _____

Job # _____

Sht. _____ of _____

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AREAS FOR PIPE SIZING

ID	AREA (AC)	ID	AREA (AC)
RD			
#1	0.06	#22	0.15
#2	0.06	#23	0.15
#3	0.06	#24	0.15
#4	0.06	#25	0.15
#5	0.06	#26	0.15
#6	0.06	#27	0.15
#7	0.06	FUTURE	
#8	0.06	#1	3.40
#9	0.06	#2	3.50
#10	0.23	#3	0.35
#11	0.22		
#12	0.08		
#13	0.08		
#14	0.08		
#15	0.20		
#16	0.20		
#17	0.15		
#18	0.15		
#19	0.28		
#20	0.28		
#21	0.28		

GROUP

MACKENZIE

0690 SW Bancroft St / PO Box 69039 Portland, OR 97201-0039
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By _____

Date _____

Job # _____

Sht. _____ of _____

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PIPE SIZING

===== BASIN RESULT SUMMARY =====

BASIN	-----VOLUME-----	-RATE-	---- <th>Hydrograph</th> <th>Area</th>	Hydrograph	Area
ID	---cf-- Ac-ft	--cfs-	-min- hours	Methodology	Acres
CB1	3459 0.08	0.21	480 8.00	SBUH Method	0.26
CB10	1597 0.04	0.10	480 8.00	SBUH Method	0.12
CB11	1464 0.03	0.09	480 8.00	SBUH Method	0.11
CB12	1464 0.03	0.09	480 8.00	SBUH Method	0.11
CB13	1464 0.03	0.09	480 8.00	SBUH Method	0.11
CB14	2661 0.06	0.16	480 8.00	SBUH Method	0.20
CB15	2794 0.06	0.17	480 8.00	SBUH Method	0.21
CB16	2794 0.06	0.17	480 8.00	SBUH Method	0.21
CB17	1464 0.03	0.09	480 8.00	SBUH Method	0.11
CB18	1464 0.03	0.09	480 8.00	SBUH Method	0.11
CB19	798 0.02	0.05	480 8.00	SBUH Method	0.06
CB2	931 0.02	0.06	480 8.00	SBUH Method	0.07
CB20	798 0.02	0.05	480 8.00	SBUH Method	0.06
CB21	3459 0.08	0.21	480 8.00	SBUH Method	0.26
CB22	1331 0.03	0.08	480 8.00	SBUH Method	0.10
CB23	3326 0.08	0.20	480 8.00	SBUH Method	0.25
CB24	3326 0.08	0.20	480 8.00	SBUH Method	0.25
CB25	1996 0.05	0.12	480 8.00	SBUH Method	0.15
CB26	2528 0.06	0.15	480 8.00	SBUH Method	0.19
CB27	1863 0.04	0.11	480 8.00	SBUH Method	0.14
CB28	1331 0.03	0.08	480 8.00	SBUH Method	0.10
CB29	2129 0.05	0.13	480 8.00	SBUH Method	0.16
CB3	665 0.02	0.04	480 8.00	SBUH Method	0.05
CB30	2262 0.05	0.14	480 8.00	SBUH Method	0.17
CB31	1730 0.04	0.11	480 8.00	SBUH Method	0.13
CB32	399 0.01	0.02	480 8.00	SBUH Method	0.03
CB33	399 0.01	0.02	480 8.00	SBUH Method	0.03
CB34	798 0.02	0.05	480 8.00	SBUH Method	0.06
CB35	2794 0.06	0.17	480 8.00	SBUH Method	0.21
CB36	1597 0.04	0.10	480 8.00	SBUH Method	0.12
CB37	2262 0.05	0.14	480 8.00	SBUH Method	0.17
CB38	2528 0.06	0.15	480 8.00	SBUH Method	0.19
CB38A	1597 0.04	0.10	480 8.00	SBUH Method	0.12
CB39	1996 0.05	0.12	480 8.00	SBUH Method	0.15
CB4	665 0.02	0.04	480 8.00	SBUH Method	0.05
CB40	4790 0.11	0.29	480 8.00	SBUH Method	0.36
CB41	1996 0.05	0.12	480 8.00	SBUH Method	0.15
CB42	2794 0.06	0.17	480 8.00	SBUH Method	0.21
CB43	4790 0.11	0.29	480 8.00	SBUH Method	0.36
CB44	931 0.02	0.06	480 8.00	SBUH Method	0.07
CB45	2661 0.06	0.16	480 8.00	SBUH Method	0.20
CB46	3326 0.08	0.20	480 8.00	SBUH Method	0.25
CB47	3859 0.09	0.24	480 8.00	SBUH Method	0.29
CB48	3459 0.08	0.21	480 8.00	SBUH Method	0.26
CB49	1730 0.04	0.11	480 8.00	SBUH Method	0.13
CB5	3193 0.07	0.20	480 8.00	SBUH Method	0.24
CB50	2395 0.05	0.15	480 8.00	SBUH Method	0.18

PIPE SIZING

===== BASIN RESULT SUMMARY =====

BASIN	-----VOLUME-----		-RATE-	----TIME-----		Hydrograph	Area
ID	---cf--	Ac-ft	--cfs-	-min-	hours	Methodology	Acres
=====							
CB51	1464	0.03	0.09	480	8.00	SBUH Method	0.11
CB52	2395	0.05	0.15	480	8.00	SBUH Method	0.18
CB53	2794	0.06	0.17	480	8.00	SBUH Method	0.21
CB54	1597	0.04	0.10	480	8.00	SBUH Method	0.12
CB55	1996	0.05	0.12	480	8.00	SBUH Method	0.15
CB56	399	0.01	0.02	480	8.00	SBUH Method	0.03
CB57	532	0.01	0.03	480	8.00	SBUH Method	0.04
CB6	1197	0.03	0.07	480	8.00	SBUH Method	0.09
CB7	1064	0.02	0.07	480	8.00	SBUH Method	0.08
CB8	1064	0.02	0.07	480	8.00	SBUH Method	0.08
CB9	1331	0.03	0.08	480	8.00	SBUH Method	0.10
DI1	6120	0.14	0.37	480	8.00	SBUH Method	0.46
DI3	3725	0.09	0.23	480	8.00	SBUH Method	0.28
FUT1	45238	1.04	2.77	480	8.00	SBUH Method	3.40
FUT2	46568	1.07	2.85	480	8.00	SBUH Method	3.50
FUT3	4657	0.11	0.29	480	8.00	SBUH Method	0.35
RD1	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD10	3060	0.07	0.19	480	8.00	SBUH Method	0.23
RD11	2927	0.07	0.18	480	8.00	SBUH Method	0.22
RD12	1064	0.02	0.07	480	8.00	SBUH Method	0.08
RD13	1064	0.02	0.07	480	8.00	SBUH Method	0.08
RD14	1064	0.02	0.07	480	8.00	SBUH Method	0.08
RD15	2661	0.06	0.16	480	8.00	SBUH Method	0.20
RD16	2661	0.06	0.16	480	8.00	SBUH Method	0.20
RD17	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD18	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD19	3725	0.09	0.23	480	8.00	SBUH Method	0.28
RD2	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD20	3725	0.09	0.23	480	8.00	SBUH Method	0.28
RD21	3725	0.09	0.23	480	8.00	SBUH Method	0.28
RD22	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD23	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD24	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD25	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD26	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD27	1996	0.05	0.12	480	8.00	SBUH Method	0.15
RD3	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD4	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD5	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD6	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD7	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD8	798	0.02	0.05	480	8.00	SBUH Method	0.06
RD9	798	0.02	0.05	480	8.00	SBUH Method	0.06

STORM SEWERS

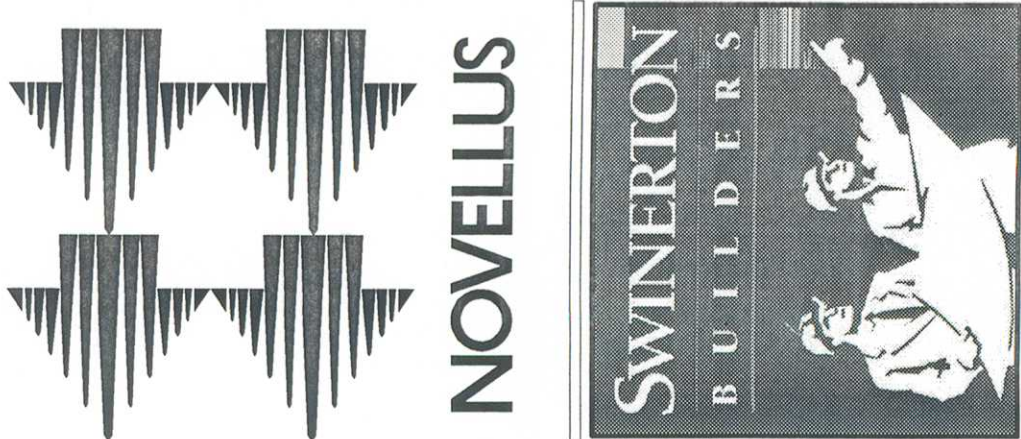
STORM SEWERS																	
SEWER LOCATION			TIME (Min.)		In./Hr.	AREA (Acres)				SEWER DESIGN				PROFILE			
						INCR. AREA	COEFF OF RUNOFF (C)	INCR. EQUIV. (C-A)	TOTAL EQUIV. AREA	RUNOFF (CFS.) (1) M (C-A)	SLOPE (%)	DIAMETER (IN.)	CAPACITY (CFS.)	VELOCITY (FPS.) <i>n=0.012</i>	LENGTH (ft.)	GROUND ELEV.	INVERT ELEV.
By: _____	_____	_____	INCR. TIME	TOTAL TIME (To Upper End)	INTENSITY (1)	7	8	9	10	11	12	13	14	15	16	UPPER	LOWER
Date: _____	_____	_____															
CK'd _____	_____	_____															
Date: _____	_____	_____															
STREET																	
1																17	18
(13) + (13) = (14)									0.20	3.97	0.5	18"	8.04				
CS #5 (15)																	
1 RO #7 (16)									0.05	0.05	1.0	6"	0.61				
RO #8 (17)									0.05	0.10	0.5	10"	1.68				
CS #6 (18)									0.07	0.17	0.5	10"	1.68				
RO #9 (19)									0.05	0.22	0.5	12"	2.73				
CS #7 (20)									0.07	0.29	0.5	15"	4.95				
CS #8 (21)									0.07	0.36	0.5	15"	4.95				
RO #10, 11 (22)									0.37	0.73	0.84	15"	4.95				
(15) + (23) = (25)										4.72	0.5	18"	8.04				
CS #9 (24)									0.08	4.80	0.5	18"	8.04				
CS #10 (25)									0.10	4.90	0.5	18"	8.04				
CS #11, 12, 13 (26)									0.27	5.17	7.05	18"	8.04				
CS #14 (27)									0.16	5.33	7.05	18"	8.04				
CS #15 (28)									0.17	5.50	7.05	18"	8.04				

STORM SEWERS

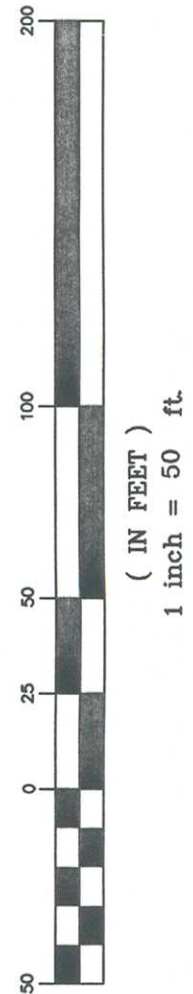
SEWER LOCATION			TIME (Min.)		IN. Hr.	AREA (Acres)				RUNOFF (CFS)	SEWER DESIGN				PROFILE		
By: _____ Date: _____ Ck'd _____ Date: _____	M.H. #	TO M.H. #	INCR. TIME	TOTAL TIME (To Upper End)		INTENSITY (1)	INCR. AREA	COEF. OF RUNOFF (c)	INCR. EQUIV. (c-f)		TOTAL EQUIV. AREA (INCR. M.H. #) c-f	SLOPE (%)	DIAMETER (IN.)	CAPACITY (CFS)	VELOCITY (FPS), n=0.012	LENGTH (ft.)	GROUND ELEV.
STREET																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CS #16, 17, 18 (29)									0.35	5.85	705	18"	30				
CS #19, 20 (30)									0.10	0.10	1.0	6"	0.12				
CS #21 (31)									0.21	0.21	2.0	6"	0.86				
CS #22 (32)									0.08	0.29	3.16	8"	2.44				
CS #23 (33)									0.20	0.49	3.16	8"	2.44				
CS #24 (34)									6.20	0.69	4.63	16"	5.10				
CS #25 (35)									6.12	0.81	4.63	16"	5.10				
CS #26 (36)									6.10	0.91	2.5	12"	6.10				
CS #27 (37)									0.11	1.02	2.5	12"	6.10				
CS #28, 29 (38)									6.22	1.24	2.5	12"	6.10				
CS #30 (39)									0.11	0.14	6.13%	6"	1.51				
CS #31 (40)									0.11	0.25	11.6%	8"	4.46				
CS #32, 33 (41)									0.04	0.29	11.6%	8"	4.46				
CS #34 (42)									0.05	0.34	11.6%	8"	4.46				

STORM SEWERS

SEWER LOCATION			TIME (Min.)		In. Hr.	AREA (Acres)				RUNOFF (CFS)	SEWER DESIGN				PROFILE		
By: _____ Date: _____ CK'd _____ Date: _____	M.E. #	TO M.E. #	INCR. TIME	TOTAL TIME (To Upper End)		INCR. AREA	COEFF OF RUNOFF (c)	INCR. EQUIV. (c-f)	TOTAL EQUIV. AREA (sq. ft.)		SLOPE (%)	DIAMETER (IN.)	CAPACITY (CFS)	VELOCITY (FPS)	LENGTH (ft.)	GROUND ELEV.	INVERT ELEV.
STREET																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CS #35 RD #22 (42)									0.29	0.63	0.5	10"	1.68				
RD #23 (43)									0.12	0.75	0.5	12"	2.73				
RD #24 (44)									0.12	0.87	0.5	12"	2.73				
(41) + (42) = (45)										1.50	1.68	12"	5.0				
CS # 36, 37 (46)									0.24	0.24	0.5	8"	0.93				
OF #3 (47)																	
FUTURE #2 (48)									2.85	3.08	5.14	18"	25.8				
CS #38 (49)									0.15	3.23	5.14	18"	25.8				
CS #38A (50)									0.10	3.33	5.14	18"	25.8				
CS #39 (51)									0.09	3.42	2.76	18"	78.9				
CS #40, 41 (52)									0.11	3.83	1.50	18"	13.9				



GRAPHIC SCALE



UTILITY NOTES

- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF TUALATIN, THE UNITED SEWAGE AGENCY, AND THE CURRENT EDITION OF THE UNIFORM STANDARD CONVENTIONS. ALL WORK WITHIN THE PUBLIC R.O.W. REQUIRES A PUBLIC WORKS PERMIT.
- THE WORKING DRAWINGS ARE GENERALLY DIAGNAMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING UNDERGROUND UTILITIES BEFORE BEGINNING THE UNITS OF EXCAVATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE UNITS OF EXCAVATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE UNITS OF EXCAVATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE UNITS OF EXCAVATION.
- PROVIDE CLEANNOTS AS REQUIRED IN THE CURRENT UNIFORM PLUMBING CODE CHAPTER 7, SECTIONS 707 AND 719, AND CHAPTER 11, SECTION 1103.04. SEE. NOT ALL REQUIRED CLEANNOTS ARE SHOWN ON THE PLANS.
- ALL STORM PIPING IS SIZED FOR A MANING'S "N" VALUE = 0.013. SEE. NOT ALL REQUIRED CLEANNOTS ARE SHOWN ON THE PLANS.
- SEE MECHANICAL DRAWINGS FOR UTILITIES LOCATED WITHIN THE BUILDING AND TO 5' OUTSIDE THE BUILDING.
- ALL ROOF DRAIN LEADERS TO BE 8" AT 2.0% MIN. UNLESS NOTED OTHERWISE.
- VERIFY LOCATION, SIZE AND DEPTH OF EXISTING UTILITIES BY PORINGING PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF DISCREPANCIES.
- PROVIDE 4" PVC DRAIN LINE FROM DOMESTIC WATER METER VAULT AND BACKFLOW PREVENTER VAULT TO THE DOUBLE DETECTOR CHECK VALVE (FIRE VAULT). PROVIDE 1/2" HP SUMP PUMP AT BASE OF FIRE VAULT AND INSTALL 2" PVC DRAIN LINE TO THE DOUBLE DETECTOR CHECK VALVE (FIRE VAULT). FURNISH 3/4" INCH DIAMETER CONDUIT FROM BUILDING ELECTRICAL ROOM TO FIRE VAULT FOR SUMP PUMP ELECTRICAL SERVICE.
- THE SURVEY INFORMATION SHOWN AS A BACKGROUND SCREEN ON THIS SHEET IS BASED ON A SURVEY PREPARED BY HICKMAN AND ASSOCIATES.
- CONTRACTOR TO PROVIDE POWER TO IRRIGATION CONTROLLER. SEE SPECIFICATIONS AND LANDSCAPE PLANS.
- SEE BUILDING PLUMBING DRAWINGS FOR PIPING WITHIN THE BUILDING AND UP TO 5' OUTSIDE THE BUILDING, INCLUDING ANY FOUNDATION DRAINAGE PIPING.
- PROVIDE MINIMUM 12.6"x12" THICK TYPE II RIP-RAP AT 12" AND LARGER STORM OUTFALLS. PROVIDE MINIMUM 8.6"x12" THICK TYPE II RIP-RAP AT 10" AND SMALLER OUTFALLS.

PROPOSED UTILITY LEGEND

- STORM SEWER LINE
- SANITARY SEWER LINE
- FIRE WATER LINE
- WATER METER
- MANHOLE
- CATCH BASIN/DITCH INLET
- FIELD INLET
- FIRE HYDRANT ASSEMBLY
- UNLESS NOTED
- U.N.

EXISTING UTILITY LEGEND

- SITE BOUNDARY
- ADJOINING OR INTERIOR PROPERTY LINE
- RIGHT-OF-WAY CENTERLINE
- WATER LINE
- GAS LINE
- SANITARY SEWER LINE
- UNDERGROUND TELEPHONE LINE (OTE)
- STORM DRAINAGE LINE
- UNDERGROUND POWER LINE
- OVERHEAD POWER LINE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- GAS VALVE
- CATCH BASIN
- CURB LINE
- EDGE OF PAVEMENT
- STREET SIGN
- SANITARY SEWER MANHOLE
- EVERGREEN TREE WITH DIAMETER
- DECIDUOUS TREE WITH DIAMETER
- CHAIN LINK FENCE LINE
- LIGHT POLE
- 6" BOLLARD
- ROOF DRAIN (SHOOT ON ROOF)
- GAS METER
- POWER TRANSFORMER
- CAMERA TOWER
- POWER POLE
- GUY ANCHOR
- SIDE INLET CATCH BASIN
- MAIL BOX
- STORM SEWER MANHOLE

SHEET TITLE
SITE
STORM
SEWER
PLAN
PHASE I

FIRST ISSUED:
LAST ISSUED:
DRAWN BY:
CHECKED BY:

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JOB NO.
JOB NO.

UTILITY PERMIT REVIEW SUBMITTAL 2/14/01

MACKENZIE.

DESIGN DRIVEN | CLIENT FOCUSED

ARCHITECTURAL REVIEW

To

City of Tualatin

For

Lam Research
Building D Expansion

Submitted

December 21, 2015

Project Number

2150163.00



MACKENZIE
Since 1960

RiverEast Center | 1515 SE Water Ave, Suite 100, Portland, OR 97214
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Exhibits

1. Application Checklist, Form, and Fact Sheet
2. Tax Maps
3. CWS Service Provider Letter (Pre-Screen)
4. Plans (11x17)
5. Republic Services Approval Letter
6. Notification Information
 - a. Mailing List
 - b. Certification of Sign Posting
7. Neighborhood Meeting Information
 - a. Mailing Affidavit
 - b. Certification of Sign Posting
 - c. Attendance Log and Notes
 - d. Invitation
 - e. GIS Buffer Map, Mailing List/Labels
8. Evidence of Pre-Application Meeting
9. Trip Generation Letter
10. Storm Report

Attached Separately

- (1) Original Application Form and Check
- (1) Mailing Labels
- (5) Trip Generation Letter
- (1) 8.5"x11" Plans
- (5) 11"x17" Plans – folded
- (5) 24"x36" Plans – folded



I. PROJECT SUMMARY

Applicant:	Lam Research, Inc.
Applicant's Representative/ Project Contact:	Mackenzie Lee Leighton, AICP, Planner III lleighton@mcknze.com 1515 SE Water Avenue, Suite 100 Portland, OR 97214 (503) 224-9560
Plan District Designation:	MP (Manufacturing Park)
Site Address:	11155-11361 SW Leveton Drive (West of SW 108th Avenue between SW Tualatin Road and SW Leveton Drive)
Site Size:	58.0 acres (3 parcels)
Tax Map/Lots:	2S1 22AA 500, 2S1 22AB 100 & 200
Request:	Architectural Review for an 18,140 square foot addition to Building D to add manufacturing capabilities and jobs
Applicable Criteria:	TDC Chapter 62: Manufacturing Park Planning District TDC Chapter 73: Community Design Standards City of Tualatin Public Works Requirements P 00-01 Conditions of Approval

II. INTRODUCTION AND PROPOSAL

Lam Research submits this application package for Architectural Review (AR) approval for an 18,140 square foot addition to Building D, a manufacturing building centrally location within the property. The submittal includes narrative, plans, drawings, and additional documentation in support of the request.

Site Description

The subject site is the Lam Research campus, located on the west side of SW 108th Avenue between SW Tualatin Road and SW Leveton Drive. The property consists of tax lots 100 and 200 of Washington County tax map 2S1 22AB, and tax lot 500 of tax map 2S1 22AA, containing a total of 58 acres. The subject lots and neighboring property to the west are in the City of Tualatin's Manufacturing Park (MP) Planning District. To the south, across SW Leveton Drive, the Fujimi site and adjacent property to its west are also in the MP District. Other neighboring industrial properties, to the east across SW 108th Avenue and across SW Leveton Drive east of Fujimi, are in the Light Manufacturing (ML) Planning District. North of the subject property, across SW Tualatin Road, there are single-family homes in the Low-Density Residential (RL) Planning District and, at the west, an assisted living facility and homes in the Medium Low Residential (RML) Planning District.

All of the site's street frontages have previously been constructed with improvements meeting the applicable City of Tualatin Public Works standards.

Previous Permits

The site was the subject of the following previous land use actions (excluding Minor Architectural Review):

MIP-89-03	Creation of 58-acre parcel
AR-89-24	Architectural Review (AR): Oki Semiconductor
IMP-00-01	Novellus Systems, Inc. Industrial Master Plan (2001)
PAR-00-04	Minor Land Partition dividing the property into three parcels (Partition Plat 2001-058)

Proposal

Lam Research (Applicant) proposes an 18,140 square foot addition to Building D, a manufacturing facility internal to the 58-acre site. The building addition will be surrounded on three sides by existing buildings. It will support and expand manufacturing operations, with a corresponding estimated increase of 30 jobs for people to work at the site when the new facility is completed.

Based on the position and height of the proposed addition in relation to existing buildings, topography and landscaping, the new construction will not be visible at all from SW Tualatin Road or SW 108th Avenue. Visibility from SW Leveton Drive will be very limited because the addition will be set back more than 450 feet from the right-of-way, and the sloping landscaped edge along the street acts as a berm with plantings that obstructs sight lines into the central part of the property.

As viewed from points within the property, the new addition's position, scale, materials, colors, and other features have been designed for compatibility and visual integration with the existing buildings

making up the Applicant's manufacturing operation. A landscape area to be reshaped by realignment of a drive aisle will be replanted to restore its appearance.

This application package addresses the applicable development standards for the proposed addition. A pre-application conference for this project was held on September 2, 2015. A neighborhood/developer meeting was held on October 13, 2015; documentation including mailing labels, invitation letter, affidavit of mailing, certification of posting, meeting sign-in sheet and meeting notes is attached to this application as Exhibit G.

Figure II.1 Aerial Map of Subject Site and Area of Work



III. DEVELOPMENT CODE COMPLIANCE OVERVIEW

With the proposed addition, the campus will continue to comply with City of Tualatin Development Code standards, as shown below. As mentioned above, this application requests AR approval for an 18,140 SF addition to Building D to support and expand existing manufacturing activities on the 58-acre site.

Table III.1 Site Analysis			
	Building D Addition	Existing	Site Total or Average
Lot Area (SF)	-	2,526,480	2,526,480
Building Area (SF)	18,140	535,000	553,140
Building Coverage On Lot (%)	-	21.2%	21.9%
Total Parking	-7	854	847
Accessible Parking	0	24	24
Van/Carpool Parking	0	18	18
Min. Required Parking (1.6/KSF)	29	856	885
Build-Out Parking (per IMP)	-		2,304

On-Site Development

This application proposes an 18,140-square-foot addition to Building D to support and expand existing manufacturing uses. The site is in the Manufacturing Park (MP) Planning District and the proposed use is permitted outright.

The proposed addition is at a central location, surrounded by the site's existing buildings, where it cannot be seen from SW Tualatin Road or SW 108th Avenue, and it will be only partially visible from SW Leveton Drive at a distance of more than 400 feet, obscured by landscaping. Its height, mass, materials and colors are designed to integrate with those of the existing buildings, including the glazing of an elevated pedestrian walkway between buildings.

No additional trash and recycling areas are proposed in conjunction with this addition to Building D because the added area and staff can be served by the existing facilities on the site. This approach has been approved by Republic Services, the solid waste hauler (see Exhibit E, letter from Frank Lonergan).

The building addition will remove seven existing parking spaces, decreasing on-site parking from the current total of 854 to 847 spaces. With the Building D expansion, minimum required parking (at 1.6 spaces per thousand square feet) increases to 885. The Industrial Master Plan (IMP-00-01) for this site anticipates its ultimate development in multiple phases, with some interim parking use at locations where future buildings are planned. At this time, operations and staffing levels at this facility do not require construction of additional parking to meet operational needs, so the Applicant can operate on a temporary basis with constructed parking at less than 1.6 parking spaces per thousand square feet of building area. The Applicant will submit plans for construction of additional parking area(s) in conjunction with the next Architectural Review for additional building(s) on the site, at a level sufficient to bring the site as a whole to the ratio of 1.6 spaces per thousand square feet of building floor area.

Because the building addition will replace part of a paved drive aisle, the Applicant has coordinated with Tualatin Valley Fire & Rescue (TVFR) to ensure that firefighting access to all of the buildings will be satisfactory.

Stormwater Management

The site's stormwater management facilities have been designed with capacity to accommodate current and future development within the whole subject property, providing substantial excess capacity to handle runoff from the current set of improvements, including the proposed addition to Building D. Runoff from roof drains and paved surfaces will be collected in new catch basins and pipes connecting to the existing on-site system (see Sheet C2.3.).

Public Facilities

Stormwater System

No new public stormwater facilities are proposed. As noted above, the site's stormwater management facilities have been designed with capacity to accommodate current and future development within the whole subject property, providing substantial excess capacity to handle runoff from the current set of improvements, including the proposed addition to Building D. Runoff from roof drains and paved surfaces will be collected in new catch basins and pipes connecting to the existing on-site system (see Sheet C2.3.).

Sanitary Sewer System

A new gravity sewer link to serve the proposed addition to Building D will be extended from an existing on-site (private) line within the drive aisle north of the expansion site, as depicted on Sheet C2.3.

Streets

The property's street frontages have previously been improved to meet public works standards, and no changes in site access (street driveway locations) or primary on-site circulation routes are proposed.

The Applicant has provided a memo from Mackenzie traffic engineer Brent Ahrend which concludes that "With the low number of peak hour trips anticipated with the expansion of Building D, impacts on these intersections will be minimal, and not trigger any offsite mitigation. Therefore, it is not anticipated a full TIA would be needed for the expansion" (see Exhibit I).

No changes in the street configurations or improvements along the property's frontages are proposed or warranted as part of the Building D addition project.

IV. ARCHITECTURAL REVIEW APPROVAL CRITERIA

This application addresses the necessary approval standards of the Tualatin Development Code relevant to Architectural Review for industrial development. As described in the following narrative, the proposal meets the standards of TDC *Chapter 62: Manufacturing Park Planning District (MP)* and TDC *Chapter 73: Community Design Standards*.

The following tables identify applicable development standards and how the proposed development satisfies each.

Table IV.2 Development Standards		
	MP District/IMP MP 00-01	Proposed Building D Addition
Setback Requirements		(from property line to addition)
Front Yard	30'	326' minimum
Side Yard	0'	515' minimum
Rear Yard	0'	843' minimum
Parking and Circulation	10' (streets) 5' (internal)	No change
Maximum Structure Height	60'	35'
Landscaping	20% of site area (per approved IMP) (42.36% for Lot 2 only)	40.47% of Lot 2
Minimum Parking (per 1,000 GSF)		847
Manufacturing (per IMP)	1.6 (885)	
Maximum Parking (per 1,000 GSF)		847
Manufacturing	<u>Zone B</u> None	
Minimum Bicycle Parking	Warehousing/Manufacturing: 2, or 0.1 per 1,000 GSF, whichever is greater (55)	No change
Percentage of Bicycle Parking to be Covered	First 5 spaces or 30% of parking spaces, whichever is greater (17)	No change

Using the minimum parking ratio for Manufacturing, 1.6 spaces per thousand square feet (KSF), the site's 847 parking spaces (existing 854 less 7 to be removed by the Building D expansion) is 38 parking spaces short of meeting the calculated minimum requirement of 885 spaces, including the Building D addition (553,140 SF at 1.6 spaces/KSF). The Industrial Master Plan (IMP-00-01) for this site anticipates its ultimate development in multiple phases, with some interim parking use at locations where future buildings are planned. At this time, operations and staffing levels at this facility do not require construction of additional parking to meet operational needs, so the Applicant can operate on a temporary basis with constructed parking at less than 1.6 parking spaces per thousand square feet of building area. The Applicant will submit plans for construction of additional parking area(s) in conjunction with the next Architectural Review for additional building(s) on the site, at a level sufficient to bring the site as a whole to the ratio of 1.6 spaces per thousand square feet of building floor area.

Chapter 62: Manufacturing Park Planning District

Section 62.020 Permitted Uses.

No building, structure or land shall be used in this district except for the following uses as restricted in TDC 62.021. [non-applicable provisions omitted for brevity]...

- (3) Manufacture, assembling and packaging of electronic equipment, instruments and devices....*
- (5) Research offices and laboratories....*
- (15) Accessory facilities and activities customarily associated with or essential to permitted uses, and operated incidental to the principal use....*

Response: The proposed addition to Building D will support and expand the site's current specialized manufacturing facilities and related research and development. The production of equipment used to make semiconductors, along with research and engineering for continued improvement to that equipment, is consistent with listed allowed uses (3), (5), and (15) in Section 62.020. Notably, the activity on the site does not produce or emit objectionable noise other than noise related to normal manufacturing activity such as truck deliveries and operation of standard equipment.

Section 62.021 Restrictions on Permitted Uses.

The following restrictions shall apply to those uses listed as permitted uses in TDC 62.020:

- (1) The use must be conducted wholly within a completely enclosed building, except off-street parking and loading, utility facilities, wireless communication facilities, and outdoor storage occupying less than ten percent of the total site area.*
- (2) The retail sale of products manufactured, assembled, packaged or wholesaled on the site is allowed provided that the retail sale area, including the showroom area, shall be no greater than 5% of the gross floor area of the building not to exceed 1,500 square feet.*
- (3) For other retail uses, excluding retail sales of products manufactured, assembled, packaged or wholesaled on the site, the following restrictions shall apply:*
 - (a) Retail uses on land designated Employment Area or Corridor on Map 9-4 shall not be greater than 60,000 square feet of gross floor area per building or business.*
 - (b) Retail commercial, retail service and professional service uses on land designated Industrial Area on Map 9-4 shall not be greater than 5,000 square feet of sales or service area in a single outlet, or not greater than 20,000 square feet of sales or service area for multiple outlets in a single building or in multiple buildings that are part of the same development project, with the following exception, which shall not be subject to the size limitations stated in this subsection:*
 - (i) Development approved through the application of standards for additional small-scale mixed uses in MP, as specified in TDC 62.023-62.024.*

Response: All production activity, with the exception of loading and unloading of equipment, will occur within the buildings as required by subparagraph (1). This proposal does not include a request to engage in on-site retail activities subject to subparagraphs (2) and (3). These provisions are satisfied.

Section 62.023 Additional Permitted Mixed Uses in MP.

Response: None of these uses are proposed. This section does not apply.

Section 62.024 Restrictions on Additional Permitted Mixed Uses in MP.

Response: No mixed uses are proposed. This section does not apply.

Section 62.030 Conditional Uses.

The following uses are permitted in accordance with TDC Chapter 32 as restricted in TDC 62.031:

- (1) *Outdoor storage activity or mechanical equipment when proposed to occupy more than ten percent of the total lot area when part of and necessary for the operation of any permitted use.*
- (2) *Residence for a caretaker when necessary for security purposes.*
- (3) *Fire station.*

Response: None of these uses are proposed. This section does not apply.

Section 62.031 Restrictions on Conditional Uses.

Response: None of these uses are proposed. This section does not apply.

Section 62.040 Prohibited Uses.

Response: None of these uses are proposed. This section does not apply.

Section 62.045 Industrial Master Plan.

Industrial Master Plans may be approved subject to TDC Chapter 37.

Response: No new Industrial Master Plan (IMP) or amendment of the existing IMP is proposed. This standard does not apply. Conditions of approval of the original Industrial Master Plan are addressed in Section VI of this narrative.

Section 62.050 Lot Size.

Response: The subject property consists of three parcels that are each consistent with the minimum lot area requirements of the approved IMP. No new lot or reconfiguration is proposed. This section does not apply.

Section 62.060 Setback Requirements.

- (1) *The setbacks set forth in an Industrial Master Plan approved in accordance with TDC Chapter 37 apply. Where setbacks are not specified in an Industrial Master Plan, TDC 62.060(2) - (5) apply.... [non-applicable provisions omitted for brevity]*

Response: The approved IMP allows an 80-foot minimum setback on the south side of the property (abutting SW Leveton Drive), a 35-foot parking and circulation area setback on the northern side of the property (abutting SW Tualatin Road), and a northern interior line set back 20 feet from existing manufacturing buildings. The proposed Building D expansion is centrally located within the property and is consistent with all applicable setback requirements.

Section 62.080 Structure Height.

- (1) *Except as provided in TDC 62.080(2) or (3), no structure shall exceed a height of 70 feet, except for flagpoles displaying the flag of the United States of America either alone or with the State of Oregon flag, which shall not exceed 100 feet above grade provided that the setbacks are not less than a distance equal to the flagpole height.*

Response: The roof of the proposed Building D addition is 35 feet high, consistent with the height of the existing Building D. Mechanical screening for rooftop equipment will be at 47 feet, which is visually consistent with the height of the existing bridge between buildings. Therefore, the proposed addition meets this requirement.

- (2) *Height Adjacent to a Residential District. Except as otherwise provided in TDC Chapter 37, where a property line, street or alley separates MP land from land in a residential district, a building, flagpole or wireless communication support structure shall not be greater than 28 feet in height at the required 50 foot or 100 foot setback line. No building or structure, including flagpoles, shall extend above a plane beginning at 28 feet in height at the required 50 foot or 100 foot setback line and extending away from and above the setback line at a slope of 45 degrees, subject always to the maximum height limitation in TDC 62.080(1).*

Response: The building will be located more than 900 feet from the residential district north of SW Tualatin Road. This standard is met.

- (3) *Wireless Communication Support Structure. Except as otherwise provided in TDC Chapter 37, the maximum structure height for a wireless communication support structure and antennas is 100 feet.*

Response: This provision is not applicable because the proposal does not include a wireless communication support structure in excess of 100 feet.

Section 62.090 Access.

Except as otherwise provided in TDC Chapter 37 and as provided below, no lot shall be created without provision for access to the public right-of-way in accordance with TDC 73.400 and TDC Chapter 75. Such access may be provided by lot frontage on a public street, or via permanent access easement over one or more adjoining properties, creating uninterrupted vehicle and pedestrian access between the subject lot and the public right-of-way. Lots and tracts created to preserve wetlands, greenways, Natural Areas and Stormwater Quality Control Facilities identified by TDC Chapters 71, 72, Figure 3-4 of the Parks and Recreation Master Plan and the Surface Water Management Ordinance, TMC 3-5, as amended, respectively, or for the purpose of preserving park lands in accordance with the Parks and Recreation Master Plan, may not be required to abut a public street.

Response: The proposed addition to Building D will not involve creation of a new lot, nor will it cause any change in site access as previously approved pursuant to this Section. This Section is not applicable.

Section 62.100 Off-Street Parking and Loading.

Except as otherwise provided under TDC Chapter 37, refer to TDC Chapter 73.

Response: For more details, please refer to the section devoted to Chapter 73 below. The proposed Building D addition will remove seven parking spaces, reducing the site total from 854 to 847 parking spaces, which is 38 spaces fewer than the calculated minimum requirement of 885 (at the manufacturing ratio of 1.6 spaces per thousand square feet, including the addition). The build-out requirement in the Industrial Master Plan (IMP) is 2,304 spaces. IMP-00-01 anticipates its ultimate development in multiple phases, with some interim parking use at locations where future buildings are planned. At this time, operations and staffing levels at this facility do not require construction of additional parking to meet operational needs, so the Applicant can operate on a temporary basis with constructed parking at less than 1.6 parking spaces per thousand square feet of building area. The Applicant will submit plans for construction of additional parking area(s) in conjunction with the next Architectural Review for additional building(s) on the site, at a level sufficient to bring the site as a whole to the ratio of 1.6 spaces per thousand square feet of building floor area.

Section 62.110 Environmental Standards.

Except as otherwise provided under TDC Chapter 37, refer to TDC Chapter 63.

Response: The proposed Building D addition is located south of an existing building that fully screens it from SW Tualatin Road (where residential uses are located on the north side of the street). Activities outside the addition will be limited to access and circulation, with operations conducted within the building. This combination of screening and the conduct of activities ensures that the facility will continue to operate in compliance with Chapter 63's standards regarding noise, vibration, air quality, odor, heat and glare, stored materials, and liquid waste materials.

Section 62.120 Community Design Standards.

Except as otherwise provided under TDC Chapter 37, refer to TDC Chapter 73.

Response: Please refer to the section devoted to Chapter 73 below.

Section 62.130 Landscape Standards.

Except as otherwise provided under TDC Chapter 37, refer to TDC Chapter 73.

Response: Please refer to the section devoted to Chapter 73 below.

Chapter 73: Community Design Standards

Architectural Review Approval

Section 73.050 Criteria and Standards

- (1) *In exercising or performing his or her powers, duties, or functions, the Planning Director shall determine whether there is compliance with the following:*
 - (a) *The proposed site development, including the site plan, architecture, landscaping, parking and graphic design, is in conformance with the standards of this and other applicable City ordinances insofar as the location, height, and appearance of the proposed development are involved;*
 - (b) *The proposed design of the development is compatible with the design of other developments in the general vicinity; and*
 - (c) *The location, design, size, color and materials of the exterior of all structures are compatible with the proposed development and appropriate to the design character of other developments in the vicinity.*

Response: The proposed addition is consistent with the existing Building D (to which it is attached) and other existing buildings on the Lam Research site. The Lam Research building complex has previously been found to comply with these requirements for compatibility with industrial development adjacent to the subject property on the west, south, and east sides, all of which are also in the MP Planning District. No changes are proposed along the north edge of the property, across SW Tualatin Road from residential development, and the proposed Building D addition will not be visible because it is behind an existing building. As explained below and based on the enclosed plans, the proposed Building D addition project meets the applicable standards of the City of Tualatin Development Code. These requirements are met.

- (2) *In making his or her determination of compliance with the above requirements, the Planning Director shall be guided by the objectives and standards set forth in this chapter. If the*

architectural review plan includes utility facilities or public utility facilities, then the City Engineer shall determine whether those aspects of the proposed plan comply with applicable standards.

Response: This application includes site plans, elevations with notes on architectural features, site grading/erosion control and utility facilities plans, a lighting plan, and a landscape planting plan. No public improvements are proposed. The submitted documents reflect the Applicant's attention to the objectives and standards in this Chapter.

(3) *In determining compliance with the requirements set forth, the Planning Director shall consider the effect of his or her action on the availability and cost of needed housing...*

Response: The proposed development does not include housing, and the subject property is not zoned to allow residential development at all. This standard does not apply.

(4) *As part of Architectural Review, the property owner may apply for approval to cut trees in addition to those allowed in TDC 34.200. The granting or denial of a tree cutting permit shall be based on the criteria in TDC 34.230.*

Response: No tree removal is proposed. This standard does not apply.

(5) *Conflicting Standards. In addition to the MUCOD requirements, the requirements in TDC Chapter 73 (Community Design Standards) and other applicable Chapters apply...*

Response: The subject site is not within the MUCOD. The applicable design standards in TDC Chapter 73 are reviewed in detail below.

Design Standards

Section 73.150 Objectives

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Site elements shall be placed and designed, to the maximum extent practicable, to:

(1) *Provide convenient walkways and crosswalks which separate pedestrians from vehicles and link primary building entries to parking areas, other on-site buildings and the public right-of-way.*

Response: The proposed site development plans for the Building D addition include pedestrian walkways consistent with these pedestrian circulation goals. This objective is met.

(2) *Avoid barriers to disabled individuals.*

Response: As shown in the attached plans, barriers to disabled individuals will be avoided and ADA and local codes will be met to provide adequate facilities. This objective is met.

(3) *Locate and design drive-through facilities in a manner which does not conflict with pedestrian routes or other vehicular circulation and minimizes adverse impacts on adjacent properties.*

Response: The proposed development does not include drive-through facilities. This objective does not apply.

(4) *Break up parking areas with landscaping (trees, shrubs and walkways) and buildings to lessen the overall impact of large paved areas.*

Response: As shown in the attached Civil and Landscape plans, seven existing parking spaces will be eliminated and no new parking is proposed. The site's parking and associated landscaping are consistent with specific standards approved in the IMP. This objective is met.

- (5) *Utilize landscaping in parking areas to direct and control vehicular movement patterns, screen headlights from adjacent properties and streets, and lessen the visual dominance of pavement coverage.*

Response: As shown in the attached Civil and Landscape plans, landscaping shapes in parking areas will provide structure and direction for vehicular movement and reduce the visual dominance of pavement coverage. A landscape island along the west edge of the drive aisle west of the expansion effectively screens headlight glare from points to the west and southwest, within the site and (at a distance of over 400 feet) from SW Leveton Drive. This objective is met.

- (6) *Provide vehicular connections to adjoining sites.*

Response: The centrally-located Building D expansion does not affect the site's primary circulation plan and routes, which have been previously approved. This objective has been addressed in previous Architectural Reviews and is not applicable to the present proposal.

- (7) *Emphasize entry drives into commercial complexes and industrial park developments with special design features, such as landscaped medians, water features and sculptures.*

Response: The centrally-located Building D expansion does not affect the site's entry drives, which have been previously approved. This objective is met.

- (8) *Locate, within parking lots, pedestrian amenities and/or landscaping in areas which are not used for vehicle maneuvering and parking.*

Response: As shown in the attached civil and landscape plans, the proposed expansion will shift the alignment of an internal drive aisle while maintaining its landscaped character and the pedestrian walkway to the parking area to the west. This objective is met.

- (9) *Encourage outdoor seating areas which provide shade during summer and sun during winter, trash receptacles and other features for pedestrian use. Plantings with a variety of textures and color are encouraged.*

Response: This proposal is for an addition to an industrial production building centrally located within the site of a manufacturing operation. Pedestrian use is limited to employees of the operation, for building access and emergency egress. For these reasons, the project area is not a suitable location for a pedestrian-oriented outdoor seating area and amenities. The planting plan for landscape areas includes a variety of textures and color. This objective does not apply in the form of a standard, but the Applicant has attempted to address it consistent with the industrial use needs of the specific location.

- (10) *Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site.*

Response: The location of the proposed building addition is a small part of a large industrial campus site that provides areas of visual and aesthetic interest for occupants and visitors at other locations. The proposed Building D expansion is specifically devoted to supporting manufacturing production and is not located at an opportunity site for this objective. For these reasons, this objective does not apply to this specific proposal.

- (11) *Conserve, protect and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas.*

Response: There are no fish or wildlife habitat areas in the project area or on the site. This objective does not apply.

(12) *Provide safe pathways for pedestrians to move from parking areas to building entrances.*

Response: As shown on the attached plans (see sheet C2.2), an existing concrete walkway will be provided along the realigned north-south drive aisle west of the building addition, and the existing path through the landscape island to the parking area to the west will be retained. This objective is met.

(13) *Design the location of buildings and the orientation of building entrances for commercial, public and semi-public uses such as churches, schools and hospitals to provide adequate pedestrian circulation between buildings and to provide preferential access for pedestrians to existing or planned transit stops and transit stations.*

Response: The proposed development does not include commercial, public, or semi-public uses. This objective does not apply.

(14) *Provide accessways between commercial, public and semi-public development and publicly-owned land intended for general public use; arterial and collector streets where a transit stop and/or a bike lane is provided or designated; and abutting residential, commercial and semi-public property.*

Response: The proposed development does not include commercial, public, or semi-public uses. This objective does not apply.

(15) *Provide accessways between industrial development and abutting greenways where a bikeway or pedestrian path is provided or designated.*

Response: The subject property is not located adjacent to a greenway. This objective is not applicable.

(16) *Accessways should be designed and located in a manner which does not restrict or inhibit opportunities for developers of adjacent properties to connect with an accessway, and provide continuity from property to property for pedestrians and bicyclists to use the accessway.*

Response: The subject property and the abutting property to the west are both developed industrial campus sites. The subject property accommodates pedestrian access on public sidewalks along the street frontages on its north, south, and east sides. The project area for the Building D expansion is internal to the site and not an appropriate location in which to require a pedestrian accessway. This objective is not applicable at the project site.

(17) *Provide preferential parking for carpool and vanpools to encourage employees to participate in carpools and vanpools.*

Response: The seven parking spaces to be eliminated by the Building D expansion are not designated preferential parking for carpools or vanpools, which will continue to be located at designated locations closer to the principal employee entrances. This objective is met.

(18) *Screen elements such as mechanical and electrical equipment, above ground sewer or water pump stations, pressure reading stations and water reservoirs from view.*

Response: The project's entire development area is screened from view from the north, east, and south by existing buildings. From the west and southwest, its visibility is limited by distance (more than 400 feet from SW Leveton Drive) as well as topography and landscaping, with plantings on an uphill slope from SW Leveton Drive and a parking lot with landscape trees in the foreground. These features satisfy this objective.

- (19) *Parking structure exteriors and underground parking should be designed to be harmonious with surrounding buildings and architecturally compatible with the treatment of buildings they serve.*

Response: The proposed development does not include any parking structures or underground parking. This objective does not apply.

- (20) *When a fish and wildlife habitat area abuts or is on the subject property the applicant and decision authority for a development application should consider locating buildings farther away from the fish and wildlife habitat area.*

Response: No fish and wildlife habitat area abuts or is on the subject property. This objective does not apply.

Section 73.160 Standards

- (1) *Pedestrian and Bicycle Circulation:*

- (b) *For Industrial Uses:*

- (i) *a walkway shall be provided from the main building entrance to sidewalks in the public right-of-way and other on-site buildings and accessways. The walkway shall be a minimum of 5 feet wide and constructed of concrete, asphalt, or a pervious surface such as pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.*

Response: As shown on the attached plans (see sheet C2.2), the realigned north-south drive aisle will include minimum 5' wide concrete walkways linking primary building entries and the parking area west of the new addition with the existing on-site walkways the connect to public sidewalks along the street frontages. Walkways will be ADA compliant. This standard is met.

- (ii) *Walkways through parking areas, drive aisles and loading areas shall have a different appearance than the adjacent paved vehicular areas.*

Response: The crosswalk across the north-south drive aisle west of the Building D expansion will be restriped following construction of the new alignment. No other pedestrian crossing of a vehicular drive aisle is affected by the proposed expansion. This standard is met.

- (iii) *Accessways shall be provided as a connection between the development's walkway and bikeway circulation system and an adjacent bike lane;*

Response: Site access and circulation for bicycle riders are available via the existing internal circulation routes and driveways on SW Tualatin Road, SW 108th Avenue, and SW Leveton Drive, as well as on the pedestrian walkways within the site. This objective is met.

- (iv) *Accessways may be gated for security purposes;*

Response: The Applicant is not proposing to gate the vehicular or pedestrian access points to the site. This standard is not applicable.

- (v) *Outdoor Recreation Access Routes shall be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.*

Response: There is no park, bikeway, or greenway with a designated bike or pedestrian path abutting the subject property. This standard is not applicable.

(c) *Curb ramps shall be provided wherever a walkway or accessway crosses a curb.*

Response: Curb ramps will be provided where the walkway crosses a curb or drive aisle, as shown on the attached site plan (see sheet C2.2). This standard is met.

(d) *Accessways shall be a minimum of 8 feet wide and constructed in accordance with the Public Works Construction Code if they are public accessways, and if they are private accessways they shall be constructed of asphalt, concrete or a pervious surface such as pervious asphalt or concrete, pavers or grasscrete, but not gravel or woody material, and be ADA compliant, if applicable.*

Response: No public accessway is proposed. As shown on the attached plans (see sheet C2.2), 5' to 6.5' wide concrete and striped walkways will be provided along the realigned north-south drive aisle between the complex of buildings and the parking area to the west, connecting to existing on-site paths connecting to the public sidewalks on the property's three street frontages. This standard is met.

(e) *Accessways to undeveloped parcels or undeveloped transit facilities need not be constructed at the time the subject property is developed. In such cases the applicant for development of a parcel adjacent to an undeveloped parcel shall enter into a written agreement with the City guaranteeing future performance by the applicant and any successors in interest of the property being developed to construct an accessway when the adjacent undeveloped parcel is developed. The agreement shall be subject to the City's review and approval.*

Response: No accessways to undeveloped parcels or transit facilities are required or proposed. This standard does not apply.

(f) *Where a bridge or culvert would be necessary to span a designated greenway or wetland to provide a connection to a bike or pedestrian path, the City may limit the number and location of accessways to reduce the impact on the greenway or wetland.*

Response: There is no wetland or greenway in or abutting the project area. This standard does not apply.

(g) *Accessways shall be constructed, owned and maintained by the property owner.*

Response: All accessways will be constructed, owned, and maintained by the applicant. This standard is met.

(2) *Drive-up Uses*

Response: The use proposed does not include a drive-up facility. This section does not apply.

(3) *Safety and Security*

(a) *Locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.*

Response: Surveillance of pedestrian, parking, and loading areas is currently provided by the orientation of existing buildings and lighting. The proposed addition to Building D will not compromise visibility of those areas for safety and security. See sheets IL1.0 and IL2.0 for lighting details and illumination levels within the proposed development area. This standard is met.

(b) *In commercial, public and semi-public development and where possible in industrial development, locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way.*

Response: The central location of the proposed Building D expansion obscures it from view behind existing buildings, or by virtue of distance (400 feet or more) and landscaping. This standard is not suitable for application at this specific project site.

- (c) *Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas.*

Response: No fish or wildlife habitat areas exist on or near the project site. As shown on the lighting plan (see sheets IL1.0 and IL2.0), site lighting will illuminate the buildings, circulation areas, and parking areas generally, but topography and existing buildings limit the visibility of the development area from the public right-of-way. Lighting will be designed to avoid shining into public rights-of-way. This standard is met.

- (d) *Provide an identification system which clearly locates buildings and their entries for patrons and emergency services.*

Response: The proposed Building D expansion will not affect the primary access/circulation pattern of the subject property. Emergency access to Building D will be added to the expanded portion of the building in a manner consistent with the existing on-site identification system. This standard is met.

- (e) *Shrubs in parking areas must not exceed 30 inches in height. Tree canopies must not extend below 8 feet measured from grade.*

Response: The proposed landscaping in the parking and circulation areas west of the Building D expansion is designed to meet these standards. No trees will be planted in clear vision areas, and seeded lawn is specified rather than shrubs in the landscape island adjacent to the north-south drive aisle. This standard is met.

- (f) *Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations shall provide a minimum 6' tall security fence or wall.*

Response: The proposed building expansion does not include any of these elements. This standard does not apply.

(4) *Service, Delivery and Screening*

- (a) *On and above grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners shall be screened with sight obscuring fences, walls or landscaping.*

Response: As shown in the attached plans, the generator, electrical equipment, scrubber, and gas cylinder will be located within walled-in areas, screened from view. Screening will be provided for rooftop-mounted mechanical equipment. This standard is met.

- (b) *Outdoor storage, excluding mixed solid waste and source separated recyclables storage areas listed under TDC 73.227, shall be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping.*

Response: The proposed addition to Building D does not include any outdoor storage. This standard does not apply.

- (c) *Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations shall be screened with sight-obscuring fences or walls and landscaping.*

Response: The proposed development does not include any of these elements. This standard does not apply.

- (5) *The Federal Americans with Disabilities Act (ADA) applies to development in the City of Tualatin. Although TDC, Chapter 73 does not include the Oregon Structural Specialty Code's (OSSC) accessibility standards as requirements to be reviewed during the Architectural Review process, compliance with the OSSC is a requirement at the Building Permit step. It is strongly recommended all materials submitted for Architectural Review show compliance with the OSSC.*

Response: The Applicant has prepared the site and building plans with the knowledge that ADA and OSSC standards must be met during the building permit process. This standard is met.

- (6) (a) *All industrial, institutional, retail and office development on a transit street designated in TDC Chapter 11 (Figure 11-5) shall provide either a transit stop pad on-site, or an on-site or public sidewalk connection to a transit stop along the subject property's frontage on the transit street.*

Response: The proposed project is not on a transit street. This standard does not apply.

- (b) *In addition to (a) above, new retail, office and institutional uses abutting major transit stops as designated in TDC Chapter 11 (Figure 11-5) shall...*

Response: The site is not abutting a major transit stop shown in the figure. This standard does not apply.

Section 73.210 Objectives

All commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Buildings shall be designed, to the maximum extent practicable, to:

- (1) *Minimize disruption of natural site features such as topography, trees and water features.*

Response: The project area is partially paved and partially within an area specifically reserved for future development at a central location within an industrial campus site. No natural features will be disturbed by the proposed building expansion. This objective is met.

- (2) *Provide a composition of building elements which is cohesive and responds to use needs, site context, land form, a sense of place and identity, safety, accessibility and climatic factors. Utilize functional building elements such as arcades, awnings, entries, windows, doors, lighting, reveals, accent features and roof forms, whenever possible, to accomplish these objectives.*

Response: The proposed Building D expansion is to add capacity to one of the existing manufacturing buildings within the Lam Research industrial campus. Other portions of the site have been designed to maximize the value and benefit of access to views, solar orientation, and other factors; however, this project area is not one of the site sub-areas with such characteristics. The building elements, including its height, mass, materials, and finishes, have been designed to match and extend the features of the existing Building D for maximum compatibility at this location. This objective is met.

- (3) *Where possible, locate loading and service areas so that impacts upon surrounding areas are minimized. In industrial development loading docks should be oriented inward to face other buildings or other loading docks. In commercial areas loading docks should face outward towards the public right-of-way or perimeter of the site or both.*

Response: No additional loading docks are included as part of this proposal. Building D, including the proposed addition, will be sufficiently served by existing loading and service areas that have been previously reviewed and approved. This objective is met.

- (4) *Enhance energy efficiency in commercial and industrial development through the use of landscape and architectural elements such as arcades, sunscreens, lattice, trellises, roof overhangs and window orientation.*

Response: The materials and finishes for the Building D expansion will equal or exceed the energy efficiency performance of the existing Building D materials they are designed to match or complement. Modern, efficient insulation will be used in all buildings according to the COMCheck energy modeling tool, in compliance with the Oregon Energy Code. This objective is met.

- (5) *Locate and design entries and loading/service areas in consideration of climatic conditions such as prevailing winds, sun and driving rains.*

Response: No additional loading docks are included as part of this proposal. Building D, including the proposed addition, will be sufficiently served by existing loading and service areas that have been previously reviewed and approved. This objective is not applicable because no new loading/service area is proposed.

- (6) *Give consideration to organization, design and placement of windows as viewed on each elevation having windows. Surveillance over parking areas from the inside, as well as visual surveillance from the outside in, should be considered in window placement.*

Response: The fenestration of the building expansion is specifically designed to match and extend that of the existing Building D, for compatibility and visual consistency. This objective is met.

- (7) *Select building materials which contribute to the project's identity, form and function, as well as to the surrounding environment.*

Response: The materials used for the building expansion are specifically designed to match and extend the appearance of the existing Building D, for compatibility and visual consistency. This objective is met.

- (8) *Select colors in consideration of lighting conditions and the context under which the structure is viewed, the ability of the material to absorb, reflect or transmit light and the color's functional role (e.g., to identify and attract business, aesthetic reasons, image-building).*

Response: The materials used for the building expansion are specifically designed to match and extend the appearance of the existing Building D, for compatibility and visual consistency. This objective is met.

- (9) *Where possible, locate windows and provide lighting in a manner which enables tenants, employees and police to watch over pedestrian, parking and loading areas.*

Response: Due to the industrial functions to be housed within the Building D expansion, the interior will not include occupied spaces with windows where occupants would have opportunities to see out to pedestrian, parking, and loading areas. This project is one of the situations contemplated by this provision where such window locations are not possible. This objective is therefore not applicable.

- (10) *Where practicable locate windows and provide lighting in a manner which enables surveillance of interior activity from the public right-of-way or other public areas.*

Response: Due to the industrial functions to be housed within the Building D expansion, the interior will not include occupied spaces with windows providing surveillance of interior activity from public areas. This project is one of the situations contemplated by this provision where such window locations are practicable. This objective is therefore not applicable.

Section 73.220 Standards

(1) *Safety and Security*

- (a) *Locate, orient and select on-site lighting to facilitate surveillance of on-site activities from the public right-of-way or other public areas without shining into public rights-of-way or fish and wildlife habitat areas.*

Response: No fish or wildlife habitat areas exist on or near the project site. As shown on the lighting plan (see sheets IL1.0 and IL2.0), site lighting will illuminate the buildings, circulation areas, and parking areas generally, but topography and existing buildings limit the visibility of the development area from the public right-of-way. Lighting will be designed to avoid shining into public rights-of-way. This standard is met.

- (b) *Provide an identification system which clearly identifies and locates buildings and their entries.*

Response: The proposed Building D expansion will not affect the primary access/circulation pattern of the subject property. Emergency access to Building D will be added to the expanded portion of the building in a manner consistent with the existing on-site identification system. This standard is met.

- (c) *Shrubs in parking areas shall not exceed 30 inches in height, and tree canopies must not extend below 8 feet measured from grade, ...*

Response: The proposed landscaping in the parking and circulation areas west of the Building D expansion is designed to meet these standards. Plantings include tree species suitable for pruning to a canopy height of at least eight feet, and seeded lawn is specified rather than shrubs in the landscape island adjacent to the north-south drive aisle. This standard is met.

Section 73.226 Objectives

All new or expanded multi-family, including townhouses, commercial, industrial, public and semi-public projects should strive to meet the following objectives to the maximum extent practicable. Architects and developers should consider these elements in designing new projects. In the Central Design District, the Design Guidelines of TDC 73.610 shall be considered. In the case of conflicts between objectives, the proposal shall provide a desirable balance between the objectives. Townhouses may necessitate a different balancing than multi-family developments such as apartments. Mixed solid waste and source separated recyclable storage areas shall be designed to the maximum extent practicable, to:

- (1) *Screen elements such as garbage and recycling containers from view.*

Response: No new garbage or recycling containers are proposed because this project will use existing garbage and recycling facilities that have previously been approved. This objective has previously been met and further review is not warranted.

- (2) *Ensure storage areas are centrally located and easy to use.*

Response: No new storage area is proposed. This provision is not applicable.

- (3) *Meet dimensional and access requirements for haulers.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

(4) *Designed to mitigate the visual impacts of storage areas.*

Response: As noted above, this project will use existing garbage and recycling facilities that have previously been approved. This objective has previously been met and further review is not warranted.

(5) *Provide adequate storage for mixed solid waste and source separated recyclables.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

(6) *Improve the efficiency of collection of mixed solid waste and source separated recyclables.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

Section 73.227 Standards

(1) *The mixed solid waste and source separated recyclables storage standards shall apply to all new or expanded multi-family residential developments containing five or more units and to new or expanded commercial, industrial, public and semi-public development.*

Response: The project is an expanded industrial development. These standards apply and are addressed below.

(2) *Minimum Standards Method.*

(a) *The size and location of the storage area(s) shall be indicated on the site plan. Compliance with the requirements set forth below are reviewed through the Architectural Review process. [detailed provisions omitted for brevity]*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

(v) *Commercial, industrial, public and semi-public developments shall provide a minimum storage area of 10 square feet plus: Office - 4 square feet/1000 square feet gross leasable area (GLA); Retail - 10 square feet/1000 square feet GLA; Wholesale/ Warehouse/ Manufacturing - 6 square feet/1000 square feet GLA; Educational and institutional - 4 square feet/1000 square feet GLA; and other - 4 square feet/1000 square feet GLA.*

Response: The 18,140 square foot building expansion requires 109 square feet of storage for the proposed R&D and Manufacturing use. This capacity is available in existing trash facilities on-site, which the staff in the expansion will use. The local garbage hauler, Republic Services, has reviewed and approved the proposed use of existing facilities (see Exhibit E, letter from Frank Lonergan). This standard is met.

(6) *Location, Design and Access Standards for Storage Areas.*

(a) *Location Standards*

(i) *To encourage its use, the storage area for source separated recyclables may be co-located with the storage area for mixed solid waste.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

(ii) *Indoor and outdoor storage areas shall comply with Building and Fire Code requirements.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers. This objective is met.

(iii) *Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.*

Response: The proposed expansion will rely on the existing hauler facilities for Building D. This standard is met.

(iv) *Exterior storage areas shall not be located within a required front yard setback or in a yard adjacent to a public or private street.*

Response: No exterior storage is proposed in a yard adjacent to a public or private street. This standard is met.

(v) *Exterior storage areas shall be located in central and visible locations on the site to enhance security for users.*

Response: This proposal does not include any new exterior storage area. This standard is not applicable.

(vi) *Exterior storage areas can be located in a parking area, if the proposed use provides parking spaces required through the Architectural Review process. Storage areas shall be appropriately screened according to TDC 73.227(6)(b)(iii).*

Response: This proposal does not include any new exterior storage area. This standard does not apply.

(vii) *Storage areas shall be accessible for collection vehicles and located so that the storage area will not obstruct pedestrian or vehicle traffic movement on site or on public streets adjacent to the site.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(b) *Design Standards*

(i) *The dimensions of the storage area shall accommodate containers consistent with current methods of local collection at the time of Architectural Review approval.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities. (See Exhibit E.) No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(ii) *Storage containers shall meet Fire Code standards and be made and covered with water proof materials or situated in a covered area.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(iii) *Exterior storage areas shall be enclosed by a sight obscuring fence or wall at least 6 feet in height. In multi-family, commercial, public and semi-public developments evergreen plants shall be placed around the enclosure walls, excluding the gate or entrance openings. Gate openings for haulers shall be a minimum of 10 feet wide and shall be capable of being secured in a closed and open position. A separate pedestrian access shall also be provided in multi-family, commercial, public and semi-public developments.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(iv) *Exterior storage areas shall have either a concrete or asphalt floor surface.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(v) *Storage areas and containers shall be clearly labeled to indicate the type of material accepted.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(c) *Access Standards*

(i) *Access to storage areas can be limited for security reasons. However, the storage areas shall be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(ii) *Storage areas shall be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access. A minimum of 10 feet horizontal clearance and 8 feet vertical clearance is required if the storage area is covered.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

(iii) *Storage areas shall be accessible to collection vehicles without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius shall be provided to allow vehicles to safely exit the site in a forward motion.*

Response: The Applicant has contacted Republic Services, which has provided a letter acknowledging the sufficiency of using the existing trash hauling facilities (see Exhibit E). No change is proposed in the facilities for haulers, which have been approved in prior Architectural Review decisions. This objective is met.

Landscaping

Section 73.240 Landscaping General Provisions

- (4) *The minimum area requirement for landscaping for uses in IN, CN, CO/MR, MC and MP Planning Districts shall be twenty-five (25) percent of the total land area to be developed. When a dedication is granted in accordance with the planning district provisions on the subject property for a fish and wildlife habitat area, the minimum area requirement for landscaping may be reduced by 2.5 percent from the minimum area requirement as determined through the AR process.*
- (6) *The minimum area requirement for landscaping for approved Industrial Master Plans shall be 20% of the total land area to be developed.*

Response: The subject property is in the MP Planning District, and it is the subject of an approved Industrial Master Plan (IMP-00-01) that required 20% minimum landscaping. The site far exceeds this minimum. On Lot 2, where the proposed expansion is located, the landscape percentage is currently 42.36%; this will decrease to 40.47% with the expansion. The Building D expansion and associated improvements will result in a net reduction of 1,595 square feet of landscaped area in the immediate vicinity of the building addition and drive aisle realignment to the west (16,117 square feet total), but the lot and site will remain well in conformance with the standard. This standard is met.

- (11) *Any required landscaped area shall be designed, constructed, installed, and maintained so that within three years the ground shall be covered by living grass or other plant materials. (The foliage crown of trees shall not be used to meet this requirement.) A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. Disturbed soils are encouraged to be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.*

Response: The proposed Building D expansion will require a westward shift of an existing north-south drive aisle. The landscape area will be re-graded and replanted using seeded grass and ginkgo biloba trees in a cluster on both sides of the pedestrian path extending west to the parking area. Lawn seed will also be used in the area north of the Building D expansion. This standard is met.

- (13) *Landscape plans for required landscaped areas that include fences should carefully integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.*

Response: No new fences are proposed for the project. This standard does not apply.

Section 73.250 Tree Preservation

- (1) *Trees and other plant materials to be retained shall be identified on the landscape plan and grading plan.*

Response: The proposed westward realignment of the north-south drive aisle will require the removal and replacement of some or all of the eight existing trees on both sides of the pedestrian path extending west to the parking area. The landscaping plan shows six ginkgo biloba trees as replacement plantings, reflecting the shortened length of the path. This standard is met.

- (2) *During the construction process:*
- (a) *The owner or the owner's agents shall provide above and below ground protection for existing trees and plant materials identified to remain.*
 - (b) *Trees and plant materials identified for preservation shall be protected by chain link or other sturdy fencing placed around the tree at the drip line.*
 - (c) *If it is necessary to fence within the drip line, such fencing shall be specified by a qualified arborist as defined in TDC 31.060.*
 - (d) *Neither top soil storage nor construction material storage shall be located within the drip line of trees designated to be preserved.*
 - (e) *Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment shall only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met.*
 - (f) *Tree root ends shall not remain exposed.*

Response: No existing trees or plant materials within the work area are proposed to remain. This standard does not apply.

- (3) *Landscaping under preserved trees shall be compatible with the retention and health of said tree.*

Response: No existing trees or plant materials within the work area are proposed to remain. This standard does not apply.

- (4) *When it is necessary for a preserved tree to be removed in accordance with TDC 34.210 the landscaped area surrounding the tree or trees shall be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, nearby landscape materials. Native trees are encouraged*

Response: No existing trees or plant materials within the work area are proposed to remain. This standard does not apply.

- (5) *Pruning for retained deciduous shade trees shall be in accordance with National Arborist Association "Pruning Standards For Shade Trees," revised 1979.*

Response: No existing trees within the work area are proposed to remain. This standard does not apply.

- (6) *Except for impervious surface areas, one hundred percent (100%) of the area preserved under any tree or group of trees retained in the landscape plan (as approved through the Architectural Review process) shall apply directly to the percentage of landscaping required for a development.*

Response: No existing trees or plant materials within the work area are proposed to remain. This standard does not apply.

Section 73.260 Tree and Plant Specifications

- (1) *The following specifications are minimum standards for trees and plants:*

- (a) *Deciduous Trees:*

Deciduous shade and ornamental trees shall be a minimum one and one-half inch (1 1/2") caliper measured six inches (6") above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be characteristically shaped specimens.

- (b) *Coniferous Trees.*
Coniferous trees shall be a minimum five feet (5') in height above ground, balled and burlapped. Bare root trees will be acceptable to plant during their dormant season. Trees shall be well branched and characteristically shaped specimens.
- (c) *Evergreen and Deciduous Shrubs.*
Evergreen and deciduous shrubs shall be at least one (1) to five (5) gallon size. Shrubs shall be characteristically branched. Side of shrub with best foliage shall be oriented to public view.
- (d) *Groundcovers.*
Groundcovers shall be fully rooted and shall be well branched or leafed. English ivy (Hedera helix) is considered a high maintenance material which is detrimental to other landscape materials and buildings and is therefore prohibited.
- (e) *Lawns.*
Lawns shall consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry. Lawns shall be 100 percent coverage and weed free.

Response: Replanting consists of seeded lawn in the reshaped/regarded landscape island and six ginkgo biloba trees adjacent to the pedestrian path to the parking area to the west. These standards are met.

- (2) *Landscaping shall be installed in accordance with the provisions of Sunset New Western Garden Book (latest edition), Lane Publishing Company, Menlo Park, California or the American Nurserymen Association Standards (latest edition).*

Response: Landscaping will be installed in accordance with the *Sunset New Western Garden Book* standards and has been designed by a professional landscape architect. This standard is met.

- (3) *The following guidelines are suggested to ensure the longevity and continued vigor of plant materials:*
 - (a) *Select and site permanent landscape materials in such a manner as to produce a hardy and drought-resistant landscaped area.*
 - (b) *Consider soil type and depth, spacing, exposure to sun and wind, slope and contours of the site, building walls and overhangs, and compatibility with existing native vegetation preserved on the site or in the vicinity.*

Response: Hardy, drought-resistant plants, appropriate to the proposed development and region, have been selected. The project contractor will test and amend the soil as needed. These guidelines are addressed.

- (4) *All trees and plant materials shall be healthy, disease-free, damage-free, well-branched stock, characteristic of the species.*

Response: All plant materials will be new and healthy. This standard is met.

- (5) *All plant growth in landscaped areas of developments shall be controlled by pruning, trimming or otherwise so that:*
 - (a) *It will not interfere with designated pedestrian or vehicular access; and*
 - (b) *It will not constitute a traffic hazard because of reduced visibility.*

Response: The selected plant materials are appropriate for the proposed development and climate and will not interfere with visibility or movement. In clear vision areas, no trees will exist within the 30" to 8' clear area. Responsibility for maintenance of landscaping is accepted by the property owner. This standard is met.

Section 73.270 Grading

- (1) *After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting.*

Response: Topsoil will be stockpiled during excavation to be used for backfill of landscape areas. Additionally, amendments will be added to the topsoil at that time. This standard is met.

- (2) *All planting areas shall be graded to provide positive drainage.*

Response: As shown on the attached grading and utility plans (see C2.2 and C2.3), catch basins and field inlets collect stormwater runoff from planting areas and convey it into the existing onsite system. This standard is met.

- (3) *Neither soil, water, plant materials nor mulching materials shall be allowed to wash across roadways or walkways.*

Response: As shown on the attached grading and utility plans (see C2.2 and C2.3), landscape areas are surrounded by curbing, with catch basins and field inlets that collect stormwater runoff from planting areas and convey it into the existing on-site system, avoiding surface flows that would cross roadways or walkways. This standard is met.

- (4) *Impervious surface drainage shall be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.*

Response: As shown on the attached grading plans (see C2.2 and C2.3), runoff from impervious surfaces will be directed to catch basins and conveyed to the existing on-site system. A catch basin has been placed to minimize surface flow at the designated walkway to the parking area to the west. This standard is met.

Section 73.280 Irrigation System Required

Except for townhouse lots, landscaped areas shall be irrigated with an automatic underground or drip irrigation system.

Response: The proposed landscaped areas will be irrigated. This standard is met.

Section 73.290 Re-vegetation in Un-landscaped Areas

The purpose of this section is to ensure erosion protection, and in appropriate areas to encourage soil amendment, for those areas not included within the landscape percentage requirements so native plants will be established, and trees will not be lost.

- (1) *Where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements, vegetation shall be replanted.*

Response: The proposed Building D expansion will occupy the southern and western parts of a seeded lawn area set aside for future development. The remainder of the future development area will be re-seeded with lawn following the proposed construction. This standard is met.

- (2) *Plant materials shall be watered at intervals sufficient to ensure survival and growth for a minimum of two growing seasons.*

Response: The Applicant will water landscape areas in conjunction with maintenance of the whole campus property, consistent with this Section.

(3) *The use of native plant materials is encouraged to reduce irrigation and maintenance demands.*

Response: In the limited landscape areas affected by this proposed building expansion, seeded lawn is used for consistency with other landscape areas at the subject property. This standard is not applicable.

(4) *Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.*

Response: There are no disturbed soils on the site that need to be amended. This standard does not apply.

Section 73.310 Landscape Standards – Commercial, Industrial, Public and Semi-Public Uses

(1) *A minimum 5'-wide landscaped area must be located along all building perimeters which are viewable by the general public from parking lots or the public right-of-way, excluding loading areas, bicycle parking areas and pedestrian egress/ingress locations...*

Response: The proposed Building D expansion and landscape area reconfiguration are centrally located within the property and not viewable by the general public. This standard is not applicable.

(2) *Areas exclusively for pedestrian use that are developed with pavers, bricks, etc., and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies, etc., may be included as part of the site landscape area requirement.*

Response: The specific location of the Building D expansion is not suitable for pedestrian amenity features. Because the Applicant has not requested credit for such amenity areas in landscape area calculations, this standard is not applicable.

(3) *All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas or undisturbed natural areas shall be landscaped.*

Response: As shown on the attached plans, all areas not occupied by the features listed in this Section are proposed to be landscaped. This standard is met.

Off-Street Parking Lot Landscaping

Section 73.320 Off-Street Parking Lot Landscaping Standards

(2) *Application. Off-street parking lot landscaping standards shall apply to any surface vehicle parking or circulation area.*

Response: As shown on the attached landscape plans, one landscape island adjacent to a vehicle parking area will need to be realigned. Its current landscaping with seeded grass and trees on both sides of a pedestrian walkway crossing it will be restored with similar features following construction. This standard is met.

Section 73.340 Off-Street Parking Lot and Loading Area Landscaping - Commercial, Industrial, Public and Semi-Public Uses, and Residential and Mixed Use Residential Uses within the Central Design District

(1) *A clear zone shall be provided for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of 8 feet as measured from the ground level,*

Response: As shown in the attached landscape plans (see L1.1 and L1.2), landscaping at the realigned drive aisle intersection northwest of the Building D expansion will meet these standards. This standard is met.

- (2) *Perimeter site landscaping of at least 5 feet in width shall be provided in all off-street parking and vehicular circulation areas (including loading areas). For conditional uses in multifamily residential planning districts the landscape width shall be at least 10 feet except for uses allowed by TDC 40.030(3), 40.030(5)(j), 40.030(5)(m), 40.030(5)(n) and 41.030(2).*

Response: As shown in the attached plans (see for example sheet C2.2), the realignment of the north-south drive aisle will maintain the width of the westerly landscape island (between it and the parking area to the west) at more than 20 feet wide, exceeding this requirement. This standard is met.

- (a) *The landscape area shall contain:*
- (i) *Deciduous trees an average of not more than 30 feet on center. The trees shall meet the requirements of TDC 73.360(7).*
 - (ii) *Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round.*
 - (iii) *Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years.*
 - (iv) *Native trees and shrubs are encouraged.*

Response: The proposed planting plan is designed to restore the current landscape character of the planter island east of the parking area, with seeded lawn punctuated by closely spaced trees surrounding the pedestrian walkway. This approach provides an equivalent number of planted trees but concentrates them around the pedestrian path to provide comfort to pedestrians and call drivers' attention to the pedestrian crossing point. This standard is met.

- (b) *Where off-street parking areas on separate lots are adjacent to one another and are connected by vehicular access, the landscaped strips required in subsection (2) of this section are not required.*

Response: The development area is not located adjacent to any property boundary or shared parking area. This standard is not applicable.

Section 73.360 Off-Street Parking Lot Landscape Islands - Commercial, Industrial, Public, and Semi-Public Uses

Response: No changes are proposed to off-street parking lots, which will remain. As shown in the attached plans (see C1.0 and C2.1), seven parking spaces located within the footprint of the building addition will be removed, but no other parking areas will change. This section does not apply.

Section 73.370 Off-Street Parking and Loading

- (2) *Off-Street Parking Provisions.*
- (a) *The following are the minimum and maximum requirements for off-street motor vehicle parking in the City...*

USE	MINIMUM MOTOR VEHICLE PARKING REQUIREMENT	MAXIMUM MOTOR VEHICLE PARKING REQUIREMENT	BICYCLE PARKING REQUIREMENT	PERCENTAGE OF BICYCLE PARKING TO BE COVERED

<u>Industrial</u>				
(i) Manufacturing	1.60 spaces per 1,000 sq. ft. of gross floor area	None	2, or 0.10 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater
(ii) Warehousing	0.30 spaces per 1,000 sq. ft. of gross floor area	Zone A: 0.4 spaces per 1,000 sq. ft. gross floor area Zone B: 0.5 spaces per 1,000 sq. ft. gross floor area	2, or 0.10 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater
(iii) Wholesale establishment	3.00 spaces per 1,000 sq. ft. of gross floor area	None	2, or 0.50 spaces per 1,000 gross sq. ft., whichever is greater	First 5 spaces or 30%, whichever is greater

Response: The adopted Industrial Master Plan (IMP-00-01) addresses the original intent of permanent and temporary parking areas as the campus develops over time, and outlines the minimum and maximum parking requirements at the time. Specifically, the adopted IMP (62.100) identifies that any “proposed off-street parking and loading will meet the minimum requirements of TDC Chapter 73, section 73.070-73.400. No parking maximums exist for manufacturing uses therefore the minimum 1.6/1000 parking ratio will be met along with minimum requirements for loading berths.”

(3) *Off-Street Vanpool and Carpool Parking Provisions.*

The minimum number of off-street Vanpool and Carpool parking for commercial, institutional and industrial uses is as follows:

Number of Required Parking Spaces	Number of Vanpool or Carpool Spaces
0 to 10	1
10 to 25	2
26 and greater	1 for each 25 spaces

Response: Carpool spaces are located on the campus, primarily south of Building F (eight spaces), with four east of Building D and four east of Building A. No changes are proposed to the existing carpool spaces. This standard is met.

73.380 Off-Street Parking Lots

Response: No changes are proposed to off-street parking lots which will remain. As shown in the attached plans (see C1.0 and C2.1), seven parking spaces within the footprint of the Building D expansion will be removed. No other parking areas will change. This section does not apply.

Section 73.390 Off-Street Loading Facilities

- (1) *The minimum number of off-street loading berths for commercial, industrial, public and semi-public uses is as follows:*

Square Feet of Floor Area	Number of Berths
Less than 5,000	0
5,000 - 25,000	1
25,000 - 60,000	2
60,000 and over	3

Response: The proposed addition to Building D will not require truck loading facilities, because Building D's existing loading facilities will be sufficient to serve the expanded building. Because loading facilities will not be affected, no further review of loading area provisions is required.

Section 73.400 Access

Response: No changes are proposed to site accesses. Access is currently available to the site via SW Leveton Drive to the south, SW 108th Avenue to the east, and SW Tualatin Road to the north, and the primary circulation aisles within the property will not be affected by the proposed Building D expansion. Therefore, no further review of access provisions is required.

V. CITY OF TUALATIN PUBLIC WORKS REQUIREMENTS

A. TMC Title 03: Utilities and Water Quality

I. TMC Chapter 03-02: Sewer Regulations; Rates

1. TMC 3-2-020 Application, Permit and Inspection Procedure.

(1) No person shall connect to any part of the sanitary sewer system without first making an application and securing a permit from the City for such connection, nor may any person substantially increase the flow, or alter the character of sewage, without first obtaining an additional permit and paying such charges therefore as may be fixed by the City, including such charges as inspection charges, connection charges and monthly service charges.

2. TMC 3-2-030 Materials and Manner of Construction.

(1) All building sewers, side sewers and connections to the main sewer shall be so constructed as to conform to the requirements of the Oregon State Plumbing Laws and rules and regulations and specifications for sewerage construction of the City.

(3) A public works permit must be secured from the City and other agency having jurisdiction by owners or contractors intending to excavate in a public street for the purpose of installing sewers or making sewer connections.

Response: An additional 12" private sewer lateral to serve the proposed Building D expansion is shown on Sheet C2.3, but it connects to an existing private sewer line within the property. No change is proposed in the property's connections to the public sanitary sewer system. Compliance with applicable standards will be achieved through City permitting procedures for on-site sewer construction.

II. TMC Chapter 03-03: Water Service

1. TMC 3-3-040 Separate Services Required.

(1) Except as authorized by the City Engineer, a separate service and meter to supply regular water service or fire protection service shall be required for each building, residential unit or structure served. For the purposes of this section, trailer parks and multi-family residences of more than four dwelling units shall constitute a single unit unless the City Engineer determines that separate services are required.

2. TMC 3-3-110 Construction Standards.

All water line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a water line, which upon completion, is intended to be dedicated to the City as part of the public water system, said extension shall be carried to the opposite property line or to such other point as determined by the City Engineer. Water line size shall be determined by the City Engineer in accordance with the City's Development Code or implementing ordinances and the Public Works Construction Code.

3. TMC 3-3-120 Backflow Prevention Devices and Cross Connections.

(2) The owner of property to which City water is furnished for human consumption shall install in accordance with City standards an appropriate backflow prevention device on the premises where any of the following circumstances exist:

(4) Except as otherwise provided in this subsection, all irrigation systems shall be installed with a double check valve assembly. Irrigation system backflow

prevention device assemblies installed before the effective date of this ordinance, which were approved at the time they were installed but are not on the current list of approved device assemblies maintained by the Oregon State Health Division, shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, are tested at least annually, and perform satisfactorily. When devices of this type are moved, or require more than minimum maintenance, they shall be replaced by device assemblies which are on the Health Division list of approved device assemblies.

4. *TMC 3-3-130 Control Valves.*

The customer shall install a suitable valve, as close to the meter location as practical, the operation of which will control the entire water supply from the service. The operation by the customer of the curb stop in the meter box is prohibited.

Response: An additional 10" private water lateral to serve the proposed Building D expansion, including installation of a new fire hydrant east of the building addition, is shown on Sheet C2.3, but it connects to an existing private water line within the property. No change is proposed in the property's connections to the public water system. Compliance with applicable standards will be achieved through City permitting procedures for on-site water line construction, including appropriate controls and other devices required by applicable codes.

III. *TMC 3-5 Additional Surface Water Management Standards*

1. *TMC 3-5-010 Policy.*

It is the policy of the City to require temporary and permanent measures for all construction projects to lessen the adverse effects of construction on the environment. The contractor shall properly install, operate and maintain both temporary and permanent works as provided in this chapter or in an approved plan, to protect the environment during the term of the project. In addition, these erosion control rules apply to all properties within the City, regardless of whether that property is involved in a construction or development activity. Nothing in this chapter shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or local authority...

2. *TMC 3-5-050 Erosion Control Permits.*

(1) *Except as noted in subsection (3) of this section, no person shall cause any change to improved or unimproved real property that causes, will cause, or is likely to cause a temporary or permanent increase in the rate of soil erosion from the site without first obtaining a permit from the City and paying prescribed fees...*

3. *TMC 3-5-060 Permit Process.*

(1) *Applications for an Erosion Control Permit. Application for an Erosion Control Permit shall include an Erosion Control Plan which contains methods and interim facilities to be constructed or used concurrently and to be operated during construction to control erosion. The plan shall include either:*

(a) *A site specific plan outlining the protection techniques to control soil erosion and sediment transport from the site to less than one ton per acre per year as calculated using the Soil Conservation Service Universal Soil Loss Equation or other equivalent method approved by the City Engineer, or*

(b) *Techniques and methods contained and prescribed in the Soil Erosion Control Matrix and Methods, outlined in TMC 3-5.190 or the Erosion*

Control Plans - Technical Guidance Handbook, City of Portland and Unified Sewerage Agency, January, 1991.

- (2) *Site Plan. A site specific plan, pre-pared by an Oregon registered professional engineer, shall be required when the site meets any of the following criteria:*
 - (a) *greater than five acres;*
 - (b) *greater than one acre and has slopes greater than 20 percent;*
 - (c) *contains or is within 100 feet of a City-identified wetland or a waterway identified on FEMA floodplain maps; or*
 - (d) *greater than one acre and contains highly erodible soils.*

Response: The Applicant has submitted plans including erosion control on Sheet C2.4.

4. *TMC 3-5-200 Downstream Protection Requirement.*
Each new development is responsible for mitigating the impacts of that development upon the public stormwater quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in TMC 3-5-210: Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;...
5. *TMC 3-5-210 Review Of Downstream System.*
For new development other than the construction of a single family house or duplex, plans shall document review by the design engineer of the downstream capacity of any existing storm drainage facilities impacted by the proposed development. That review shall extend downstream to a point where the impacts to the water surface elevation from the development will be insignificant, or to a point where the conveyance system has adequate capacity, as determined by the City Engineer. To determine the point at which the downstream impacts are insignificant or the drainage system has adequate capacity, the design engineer shall submit an analysis using the following guidelines:
 - (1) *evaluate the downstream drainage system for at least ¼ mile;*
 - (2) *evaluate the downstream drainage system to a point at which the runoff from the development in a build out condition is less than 10 percent of the total runoff of the basin in its current development status. Developments in the basin that have been approved may be considered in place and their conditions of approval to exist if the work has started on those projects;*
 - (3) *evaluate the downstream drainage system throughout the following range of storms: 2, 5, 10, 25 year;*
 - (4) *The City Engineer may modify items 1, 2, 3 to require additional information to determine the impacts of the development or to delete the provision of unnecessary information.*
6. *TMC 3-5-220 Criteria For Requiring On-Site Detention To Be Constructed.*
The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance. On-site facilities shall be constructed when any of the following conditions exist:
 - (1) *There is an identified downstream deficiency, as defined in TMC 3-5-210, and detention rather than conveyance system enlargement is determined to be the more effective solution...*

Response: Existing on-site facilities were designed to accommodate anticipated build-out conditions. The Applicant has provided a storm report analyzing the capacity of the existing on-site stormwater management facilities to accommodate additional runoff from the proposed expansion project. The report concludes that on-site system capacities are sufficient.

IV. TMC 3-5 Permanent On-Site Water Quality Facilities

1. TMC 3-5-280 Placement Of Water Quality Facilities.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility.

Response: The site's existing water quality facilities are not located in wetlands or associated buffers. This criterion is met.

2. TMC 3-5-290 Purpose Of Title.

The purpose of this title is to require new development and other activities which create impervious surfaces to construct or fund on-site or off-site permanent water quality facilities to reduce the amount of phosphorous entering the storm and surface water system.

3. TMC 3-5-300 Application Of Title.

Title III of this Chapter shall apply to all activities which create new or additional impervious surfaces, except as provided in TMC 3-5.310.

4. TMC 3-5-310 Exceptions.

- (1) *Those developments with application dates prior to July 1, 1990, are exempt from the requirements of Title III. The application date shall be defined as the date on which a complete application for development approval is accepted by the City in accordance with City regulations.*
- (2) *Construction of one and two family (duplex) dwellings are exempt from the requirements of Title III.*
- (3) *Sewer lines, water lines, utilities or other land development that will not directly increase the amount of stormwater run-off or pollution leaving the site once construction has been completed and the site is either restored to or not altered from its approximate original condition are exempt from the requirements of Title III.*

5. TMC 3-5-320 Definitions.

- (1) *"Stormwater Quality Control Facility" refers to any structure or drainage way that is designed, constructed and maintained to collect and filter, retain, or detain surface water run-off during and after a storm event for the purpose of water quality improvement. It may also include, but is not limited to, existing features such as constructed wetlands, water quality swales, low impact development approaches ("LIDA"), and ponds which are maintained as stormwater quality control facilities.*
- (2) *"Low impact development approaches" or "LIDA: means stormwater facilities constructed utilizing low impact development approaches used to temporarily store, route or filter run-off for the purpose of improving water quality. Examples include; but are not limited to, Porous Pavement, Green Roofs, Infiltration Planters/Rain Gardens, Flow-Through Planters, LIDA Swales, Vegetated Filter Strips, Vegetated Swales, Extended Dry Basins, Constructed Water Quality Wetland, Conveyance and Stormwater Art, and Planting Design and Habitats.*
- (3) *"Water Quality Swale" means a vegetated natural depression, wide shallow ditch, or constructed facility used to temporarily store, route or filter run-off for the purpose of improving water quality.*

- (4) *"Existing Wetlands" means those areas identified and delineated as set forth in the Federal Manual for Identifying the Delineating Jurisdictional Wetlands, January, 1989, or as amended, by a qualified wetlands specialist.*
 - (5) *"Created Wetlands" means those wetlands developed in an area previously identified as a non-wetland to replace, or mitigate wetland destruction or displacement.*
 - (6) *"Constructed Wetlands" means those wetlands developed as a water quality or quantity facility, subject to change and maintenance as such. These areas must be clearly defined and/or separated from existing or created wetlands. This separation shall preclude a free and open connection to such other wetlands.*
6. *TMC 3-5-330 Permit Required.*
Except as provided in TMC 3-5-310, no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit.
7. *TMC 3-5-340 Facilities Required.*
For new development, subject to the exemptions of TMC 3-5-310, no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III.
8. *TMC 3-5-345 Inspection Reports.*
The property owner or person in control of the property shall submit inspection reports annually to the City for the purpose of ensuring maintenance activities occur according to the operation and maintenance plan submitted for an approved permit or architectural review.
9. *TMC 3-5-350 Phosphorous Removal Standard.*
The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics.
10. *TMC 3-5-360 Design Storm.*
The stormwater quality control facilities shall be designed to meet the removal efficiency of TMC 3-5-350 for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours.
11. *TMC 3-5-370 Design Requirements.*
The removal efficiency in TDC Chapter 35 specifies only the design requirements and are not intended as a basis for performance evaluation or compliance determination of the stormwater quality control facility installed or constructed pursuant to this Title III.
12. *TMC 3-5-330 Permit Required.*
Except as provided in TMC 3-5-310, no person shall cause any change to improved or unimproved real property that will, or is likely to, increase the rate or quantity of run-off or pollution from the site without first obtaining a permit from the City and following the conditions of the permit.
13. *TMC -5-340 Facilities Required.*
For new development, subject to the exemptions of TMC 3-5-310, no permit for construction, or land development, or plat or site plan shall be approved unless the conditions of the plat, plan or permit approval require permanent stormwater quality control facilities in accordance with this Title III.
14. *TMC 3-5-390 Facility Permit Approval.*

A stormwater quality control facility permit shall be approved only if the following are met:

- (1) The plat, site plan, or permit application includes plans and a certification prepared by an Oregon registered, professional engineer that the proposed stormwater quality control facilities have been designed in accordance with criteria expected to achieve removal efficiencies for total phosphorous required by this Title III. Clean Water Services Design and Construction Standards shall be used in preparing the plan for the water quality facility; and*
- (2) The plat, site plan, or permit application shall be consistent with the areas used to determine the removal required in TMC 3-5-350; and*
- (3) A financial assurance, or equivalent security acceptable to the City, is provided by the applicant which assures that the stormwater quality control facilities are constructed according to the plans established in the plat, site plan, or permit approval. The financial assurance may be combined with our financial assurance requirements imposed by the City; and*
- (4) A stormwater facility agreement identifies who will be responsible for assuring the long term compliance with the operation and maintenance plan.*

15. TMC 3-5-420 Residential Developments.

The permanent stormwater quality control facilities for the construction of any single family and duplex subdivision shall be adequately sized for the public improvements of the subdivision and for the future construction of single family and duplex houses on the individual lots at a rate of 2,640 square feet of impervious surface per dwelling unit.

Response: The applicant has submitted plans showing existing water quality facilities supported by stormwater calculations showing adequate treatment of impervious area.

B. Chapter 04-02: Fire Hydrant Locations and Rates Of Flow

I. TMC 4-2-010 Hydrants and Water Supply for Fire Protection.

- (1) Every application for a building permit and accompanying plans shall be submitted to the Building Division for review of water used for fire protection, the approximate location and size of hydrants to be connected, and the provisions for access and egress for firefighting equipment. If upon such review it is determined that the fire protection facilities are not required or that they are adequately provided for in the plans, the Fire and Life Safety Reviewer shall recommend approval to the City Building Official.*
- (2) If adequate provisions for such facilities are not made, the Fire and Life Safety Reviewer shall either recommend against approval of the plans or indicate to the applicant in writing where the plans are deficient or recommend approval of plans subject to conditions.*

Response: The Applicant has submitted plans including a private water line extension within the site to serve the proposed building addition as well as a new fire hydrant east of it. No new public fire hydrant is required.

C. TDC Chapter 13: Sewer Service, Section 13.060 Existing System

Response: The Applicant's plans show a new private sewer lateral from an existing private sewer line within the site to the proposed Building D expansion, but no change is proposed in the property's existing connection to the public sewer system. The project will cause no significant impact on the public sewer system.

VI. ORIGINAL MASTER PLAN CONDITIONS OF APPROVAL (MP 00-01)

The following presents the original conditions of approval for the campus's master plan, with applicable requirements addressed.

1. *Alternative Methods*

- a. *To meet the requirements of the TDC, through the Architectural Review process, building setbacks shall not be approved less than 68 feet to SW Leveton Drive and 98 feet to SW 108th Avenue after required dedication of right-of-way, turn lane and intersection improvements. Building setbacks to SW Tualatin Road shall meet the requirements of TDC 62.060(2)(a) and 62.080(2). Interior side yard building setbacks shall be no less than 20 feet, except setbacks to the common property line with JAE shall be no less than 100 feet.*
- b. *To meet the requirements of the TDC, through the Architectural Review process parking/circulation setbacks shall not be approved less than 108 feet to SW Leveton Drive and 43 feet to SW 108th Avenue after required dedication of right-of-way, turn lane and intersection improvements. Interior side yard parking and circulation setbacks shall be as shown on Exhibit 2, Sheet SD-5, dated December 22, 2000.*
- c. *As mitigation for a reduced parking and circulation setbacks to SW Tualatin Road an earthen berm with landscaping consisting of deciduous street trees, evergreen trees and shrubs shall be provided along SW Tualatin Road, the large evergreen trees along the roadway shall be retained and the berm and landscaping shall be installed as part of the Phase 1 development. The final design of the berm and landscaping shall be reviewed through the Architectural Review process.*
- d. *Through the Partition and Architectural Review processes shared parking and circulation easements shall be reviewed and evaluated. Where necessary, shared parking and circulation easements shall be established.*
- k. *To meet the requirements of the TDC, through the Architectural Review process final parking areas shall be determined and the stand of trees behind the former Oki manufacturing building shall be retained or integrated into the parking lot design as determined appropriate.*
- f. *To ensure that vehicular access requirements meet the TDC, through the Partition and Architectural Review processes shared site vehicular accesses will need to be reviewed and evaluated. Where necessary, shared site vehicular access easements shall be established.*
- g. *To meet the requirements of the TDC, through the Architectural Review processes loading areas that encroach onto a separate adjoining lot, excluding JAE, will need to be reviewed and evaluated. If encroachments off-site and into parking areas are necessary the Architectural Review process shall determine the appropriateness.*
- k. *Through the Partition and Architectural Review processes shared onsite utilities shall be reviewed and evaluated. Where necessary, easements shall be established.*
- i. *The applicant shall submit a partition application to the City to partition the site into the proposed three individual lots.*
- j. *The applicant's request for an alternative method in parking lot landscaping requirements is acceptable for surface parking proposed for the south-half of the site as depicted in the applicant's proposal (Exhibit 2). Proposed parking lot landscaping for the north-half of the site shall follow the standard requirements of Chapter 73 of the TDC.*
- k. *The applicant shall be required to submit an Architectural Review application meeting the requirements of the TDC and include the alternative methods approved through the*

Industrial Master Plan. If future modifications to an approved Industrial Master Plan are necessary, a new Industrial Master Plan application shall be submitted to the City for review.

Response: These conditions were met through the Architectural Review, Partition, and building permit applications submitted to City of Tualatin for the campus's construction. The expansion proposal does not affect these conditions.

2. *Public Facilities*

- a. *Through the Architectural Review process Novellus shall address the ODOT recommended condition of approval concerning the 99W/124th Avenue intersection contained in Exhibit D.*
- b. *At the time of submittal of Architectural Review applications for each phase of on-site development a traffic analysis report shall be submitted and improvements identified. The traffic analysis report shall be reviewed through the Public Facilities component of the Architectural Review process and conditions applied.*
- c. *Construction of Phases 2-4, when proposed, shall be evaluated through the Architectural Review process on the availability of an adequate City water supply to service the proposed development phase.*
- d. *Through the Architectural Review process the volume and pressure needs for each development phase shall be evaluated. Based on calculations, the water transmission line may be required to be extended to serve the development.*
- e. *Through the Architectural Review process the applicant shall submit evaluations on the downstream sanitary sewer system and the discharge rates and volumes per proposed development phase and participate where required in mitigation measures. Recycling and reuse options shall be considered by the applicant to reduce the discharge rates and volumes. The applicant shall work with the City to develop a program to release the sanitary sewer discharge during off-peak hours.*
- f. *Through the Architectural Review process the adequacy of on-site stormwater detention shall be evaluated and Novell us shall provide supporting documentation and calculations showing adequacy of the storm system. At the time road widening for SW Leveton Drive or SW 108th Avenue is required, Novellus shall submit drawings and calculations for water quality and detention for review and approval as part of the Architectural Review process.*

Response: These conditions were met through the Architectural Review, public works, and building permit applications submitted to City of Tualatin for the campus's construction. The expansion proposal does not affect these conditions.

3. *Location, Design, Color and Materials*

- a. *Through the Architectural Review process, final material colors shall be presented for approval based on the pallet of colors identified in the Industrial Master Plan.*
- b. *Through the Architectural Review process, final building materials shall be presented for approval based on the pallet of materials identified in the Industrial Master Plan.*

Response: These conditions were met through the Architectural Review and building permit applications submitted to City of Tualatin for the campus's construction. The colors and materials of the proposed expansion will match and complement the existing building.

VII. SUMMARY

The proposed Building D expansion is centrally located in an area reserved for additional development within the Lam Research industrial campus. The building will not be visible from SW Tualatin Road and the neighboring residential areas to the north, from SW 108th Avenue, or from most of the site's SW Leveton Drive frontage, because it will be concealed behind existing buildings from those directions. (From points along SW Leveton Drive west of the site, and along the westerly approximately one-quarter of the site's frontage, visibility will be obscured by topography, landscaping, and a distance of more than 400 feet from the right-of-way.) The proposed industrial building expansion will support and grow the existing manufacturing capacity at the site, with a corresponding increase in on-site employment of 30 jobs. The Applicant has demonstrated that the expansion will not significantly affect surrounding properties or transportation and utility systems, that its materials and appearance will be consistent with the existing Lam Research buildings surrounding it, and that the applicable standards have been met. For these reasons, the Applicant respectfully requests approval of the proposed project.

MACKENZIE.

DESIGN DRIVEN | CLIENT FOCUSED

September 28, 2015

City of Tualatin
Attention: Tony Doran
18880 SW Martinazzi Avenue
Tualatin, OR 97062

Re: **Lam Research R&D Building D Addition**
Trip Generation Letter
Project Number 2150163.00

Dear Mr. Doran:

Mackenzie has prepared this letter to present the anticipated trip generation of the proposed expansion of Building D on the Lam Research campus at 11357 SW Leveton Drive in Tualatin, Oregon, for purposes of determining the need for a Traffic Impact Analysis (TIA) report. For the reasons presented below, we do not believe a TIA would be needed.

PROPOSED EXPANSION

The proposed building is to expand by 26,000 square feet and will support 30 employees. The expansion is proposed to be a two-story cleanroom with a sublevel containing the HVAC and associated machinery supporting the cleanroom. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition*, was used to estimate the trip generation associated with the proposed development. Per the *Trip Generation Manual*, a 26,000 square foot Manufacturing (LUC 140) facility is estimated to generate 19 AM peak hour trips, 19 PM peak hour trips, and 99 average daily trips (ADT).

No other site changes are proposed with the building expansion.

HISTORY

A transportation impact analysis (TIA) was prepared in 2001 by Mackenzie, which addressed a Master Plan with a total of 448,000 square feet of manufacturing and research and development uses. Although trips for the Master Plan were never recognized as "vested" by the City, it should be acknowledged that the proposed expansion is a very small percentage of the master plan development.

The TIA concluded that no intersections would be significantly impacted as a result of the master plan project trips, with the exception of the SW Herman Road/SW 108th Avenue intersection, which was anticipated to operate at LOS F with the project. The intersection has since been signalized as was recommended in the TIA; with signalization, the TIA anticipated operation at a level of service B.



P 503.224.9560 ■ F 503.228.1285 ■ W MCKNZE.COM ■ RiverEast Center, 1515 SE Water Avenue, #100, Portland, OR 97214
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Portland, Oregon ■ Vancouver, Washington ■ Seattle, Washington

TIA REQUIREMENT

The City of Tualatin does not have any specific trip thresholds for requiring a TIA, but does generally require one address all intersections within a ¼ mile of the site. The intersections within this distance include the following:

- Leveton Drive/SW 118th Avenue
- Leveton Drive/SW 108th Avenue
- Tualatin Road/SW 108th Avenue
- Tualatin Road/SW Teton Avenue
- Herman Road/SW 108th Avenue
- Herman Road/SW Teton Avenue

The two intersections on Herman Road at SW 108th Avenue and Teton Avenue have both been signalized since the 2001 TIA was prepared. All other intersections were anticipated to operate at acceptable levels in the TIA.

With the low number of peak hour trips anticipated with the expansion of Building D, impacts on these intersections will be minimal, and not trigger any offsite mitigation. Therefore, it is not anticipated a full TIA would be needed for the expansion.

If you have any questions regarding this trip generation letter and our recommendation to not require a TIA, please do not hesitate to contact me.

Sincerely,



Brent Ahrend, PE
Senior Associate | Traffic Engineer

Enclosure(s): Plans

c: Janet Jones, Peter Alto, Lee Leighton – Mackenzie



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Client



Project
**DLA TUALATIN
BUILDING D
ADDITION**

**11857 SW LEVETON DR
TUALATIN, OR 97062**

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REVISIONS:

REVISION THIS SHEET	REVISIONS CLOSING DATE

SHEET TITLE:

**OVERALL
SITE PLAN**

DRAWN BY: ELJ

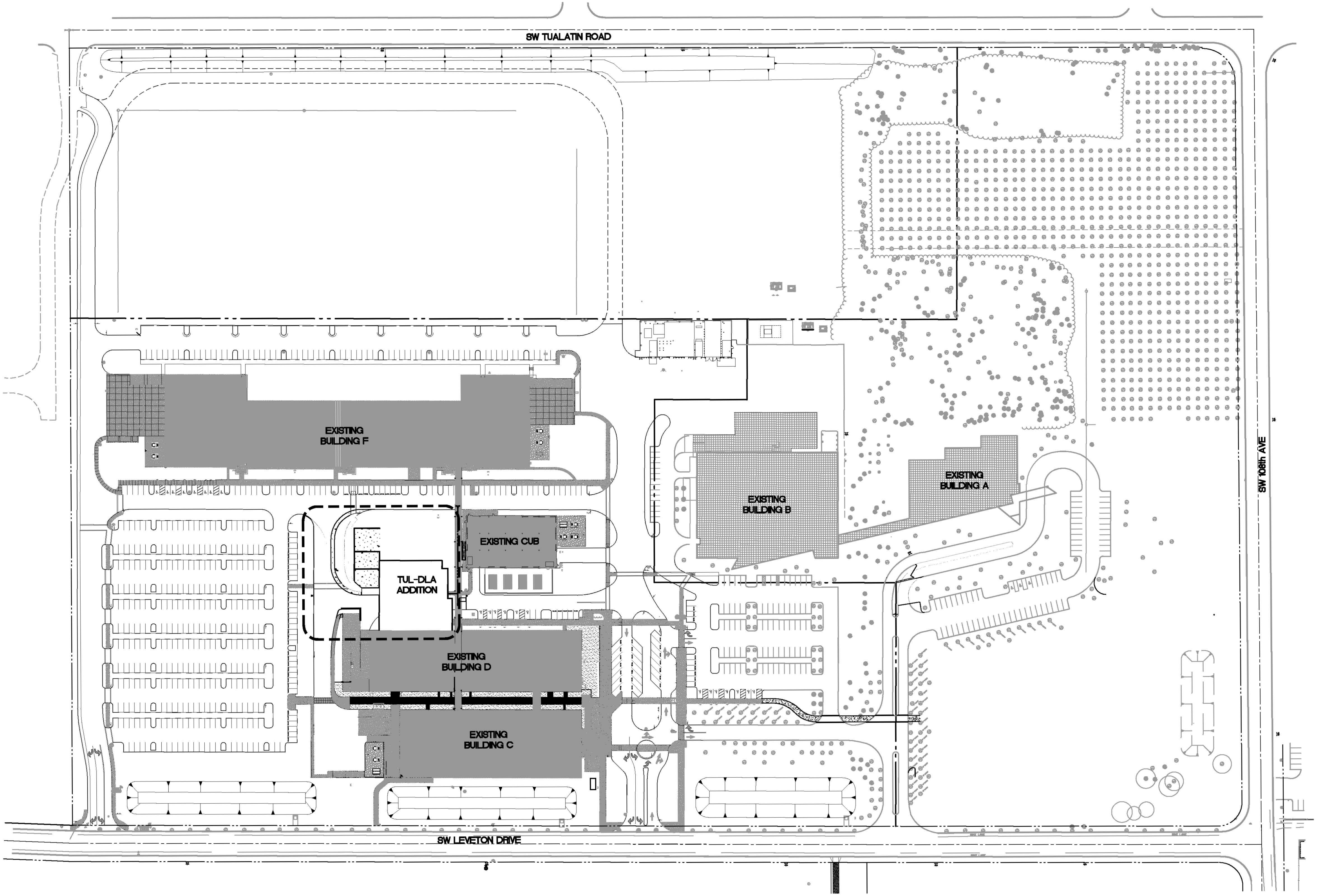
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SHEET:

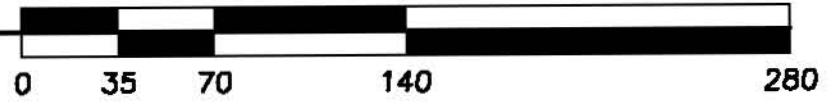
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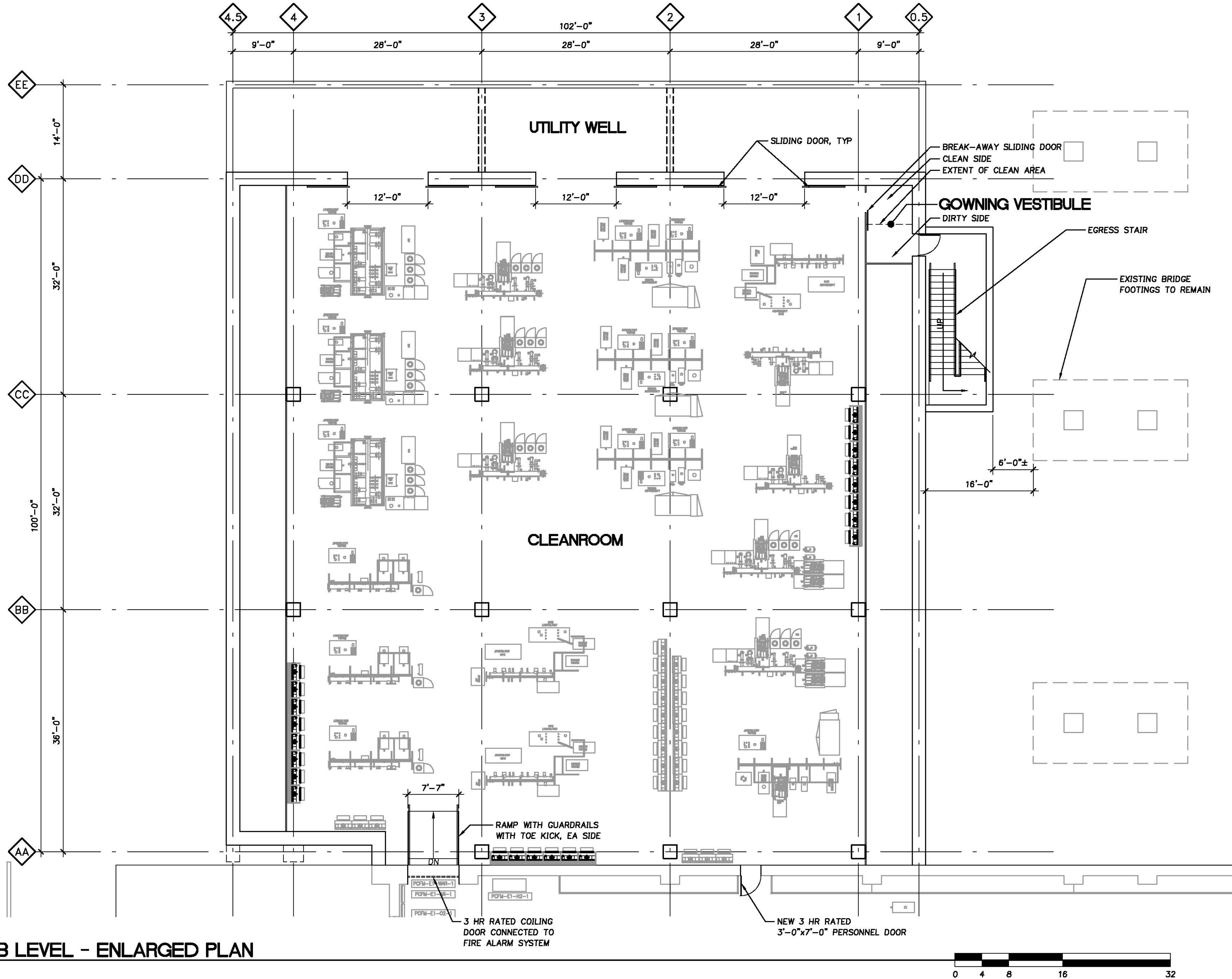
JOB NO. **2150163.00**

DESIGN REVIEW - 8/19/15
215016300\A_DRAWINGS\ARCHITECTURAL\EXHIBITS\OVERALL\TEXTWORK\WRITE-EXHIBIT.DWG ELJ 08/19/15 13:11 1:70.00

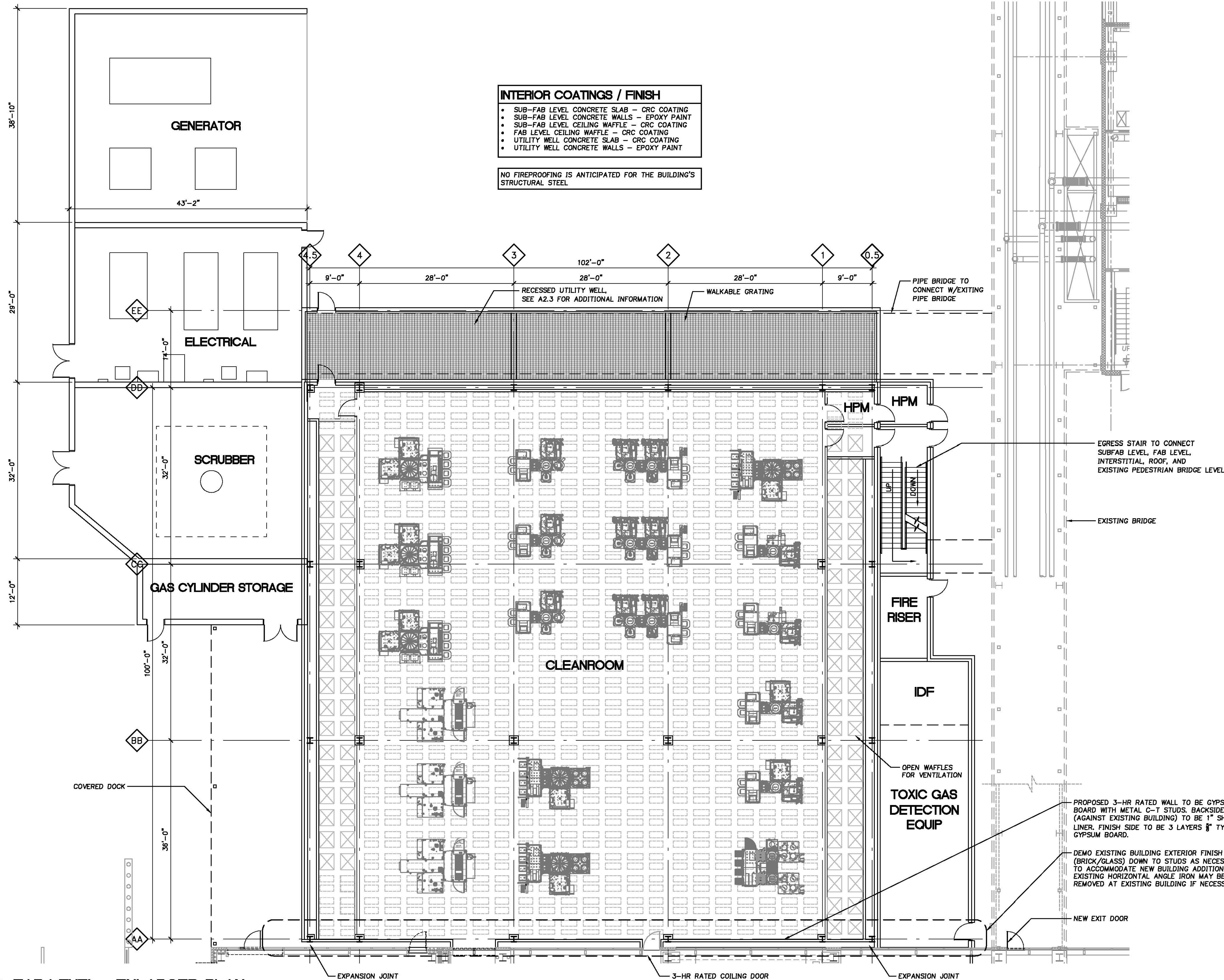


OVERALL SITE PLAN

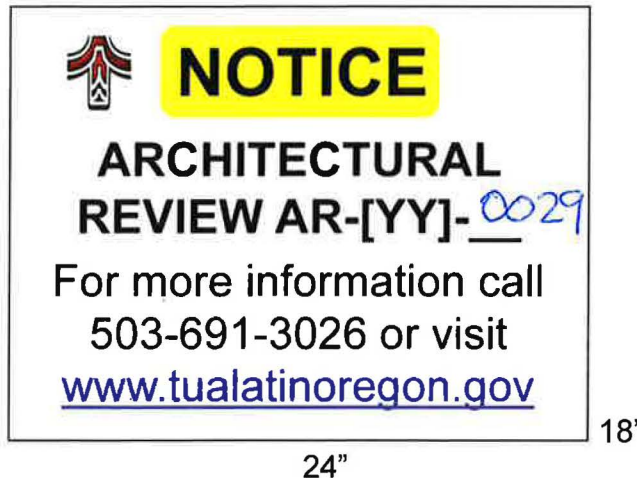




NO.	REVISIONS	REVISION DATE	DELTA
1	REVISIONS	REVISION DATE	DELTA
2	REVISIONS	REVISION DATE	DELTA
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10	REVISIONS	REVISION DATE	DELTA



ARCHITECTURAL REVIEW CERTIFICATION OF SIGN POSTING



The applicant shall provide and post a sign pursuant to Tualatin Development Code (TDC) 31.064(2). Additionally, the 18" x 24" sign must contain the application number, and the block around the word "NOTICE" must remain **primary yellow** composed of the **RGB color values Red 255, Green 255, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates>.

NOTE: For larger projects, the Community Development Department may require the posting of additional signs in conspicuous locations.

As the applicant for the Lam Building D Expansion

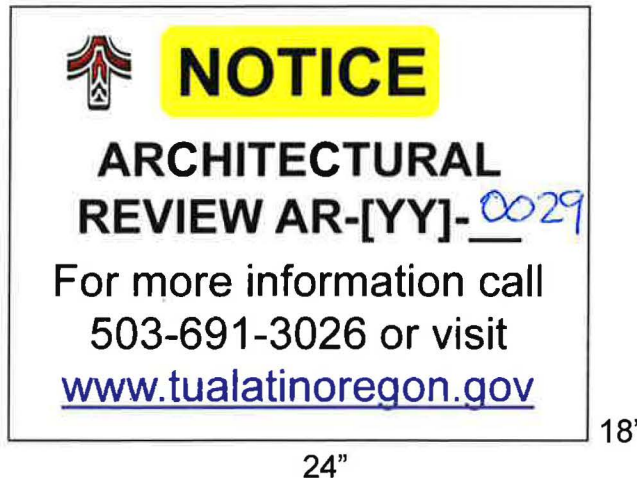
project, I hereby certify that on this day, 3 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Department - Planning Division.

Applicant's Name: ~~Suzannah Stanley~~ Tom Wright
(PLEASE PRINT)

Applicant's Signature: _____

Date: 12/21/15

ARCHITECTURAL REVIEW CERTIFICATION OF SIGN POSTING



The applicant shall provide and post a sign pursuant to Tualatin Development Code (TDC) 31.064(2). Additionally, the 18" x 24" sign must contain the application number, and the block around the word "NOTICE" must remain **primary yellow** composed of the **RGB color values Red 255, Green 255, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates>.

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Applicant's Name: ~~Suzannah Stanley~~ Tom Wright
(PLEASE PRINT)

Applicant's Signature: _____

Date: 12/21/15

NEIGHBORHOOD/DEVELOPER MEETING AFFIDAVIT OF MAILING

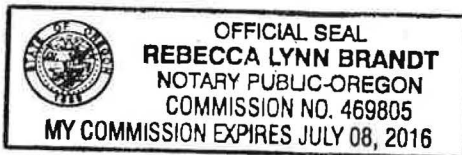
STATE OF OREGON)
) SS
COUNTY OF WASHINGTON)

I, Suzannah Stanley, being first duly sworn, depose and say:

That on the 29 day of September, 2015, I served upon the persons shown on Exhibit "A," attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.


Signature

SUBSCRIBED AND SWORN to before me this 30th day of September, 2015.




Notary Public for Oregon
My commission expires: 07/08/2016

RE: LAm Bldg. D expansion

NEIGHBORHOOD / DEVELOPER MEETING CERTIFICATION OF SIGN POSTING

NOTICE NEIGHBORHOOD / DEVELOPER MEETING __/__/2010 __:__.m. __ SW __ 503-__-__	18"
24"	

In addition to the requirements of TDC 31.064(2) quoted earlier in the packet, the 18" x 24" sign that the applicant provides must display the meeting date, time, and address and a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the **RGB color values Red 254, Green 127, and Blue 0**. Additionally, the potential applicant must provide a flier (or flyer) box on or near the sign and fill the box with brochures reiterating the meeting info and summarizing info about the potential project, including mention of anticipated land use application(s). Staff has a Microsoft PowerPoint 2007 template of this sign design available through the Planning Division homepage at < www.tualatinoregon.gov/planning/land-use-application-sign-templates >.

As the applicant for the

LAm Bldg. D expansion project, I

hereby certify that on this day, 3 sign(s) was/were posted on the

subject property in accordance with the requirements of the Tualatin Development Code

and the Community Development Department - Planning Division.

Applicant's Name: Suzannah Stanley
(PLEASE PRINT)

Applicant's Signature: [Signature]

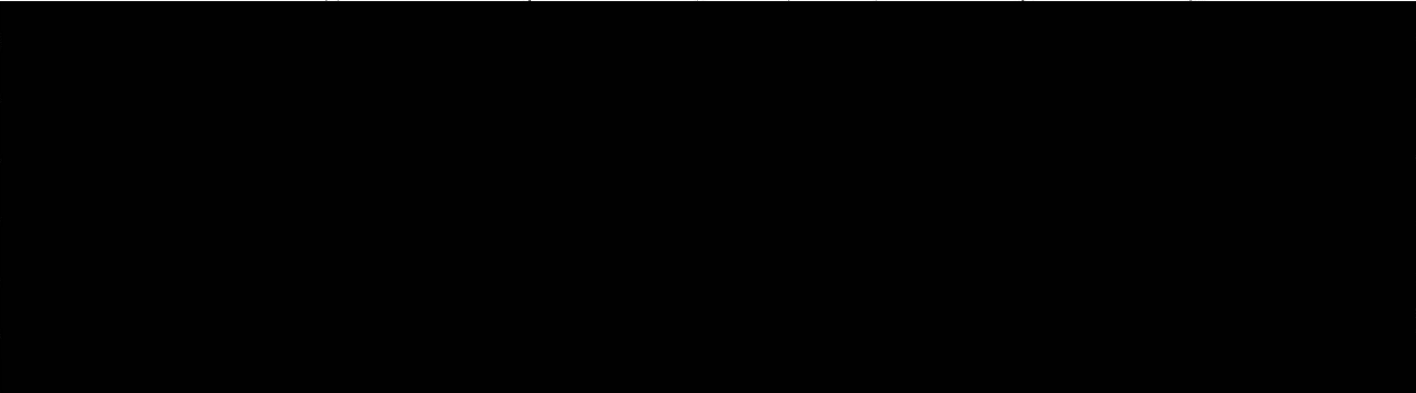
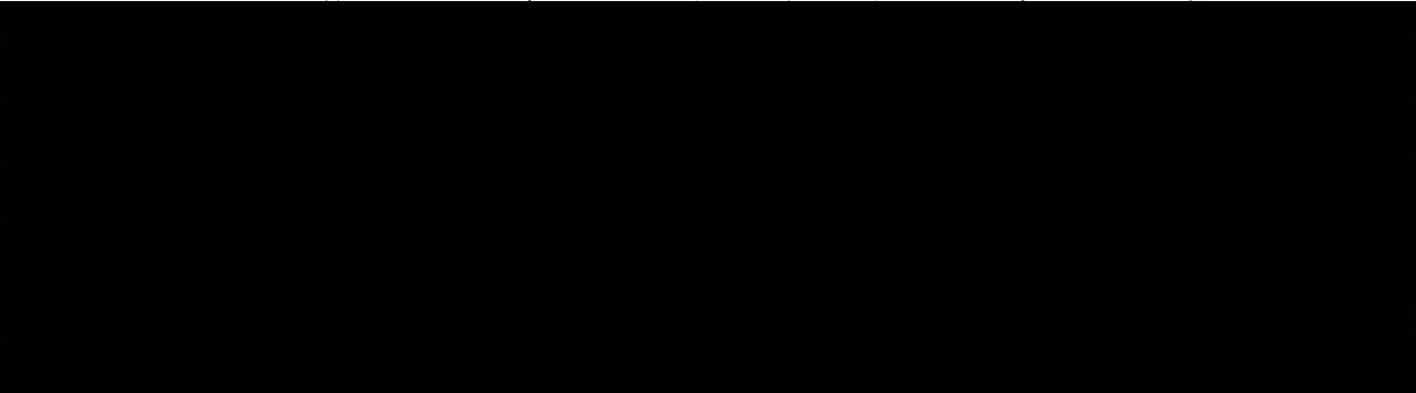
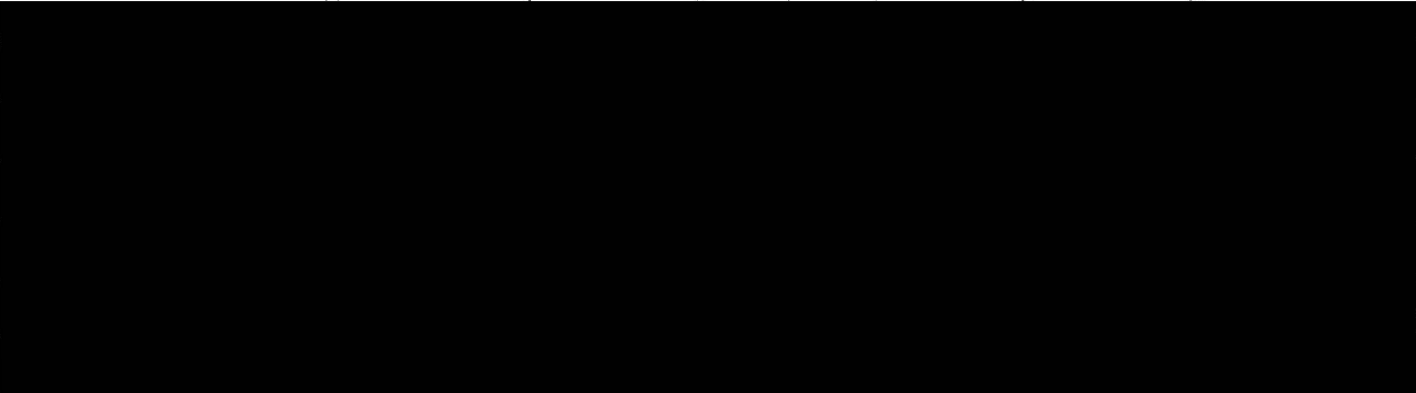
Date: 9/29/15

MACKENZIE. SIGN-IN SHEET

DESIGN DRIVEN | CLIENT FOCUSED

PROJECT NUMBER: 2150163.00
PROJECT NAME: LAM Building D Expansion

SUBJECT: (Neighborhood Meeting / October 13, 2015)

Name	Address	Email	Representing
Rick + Karen Miller			
Michael Halvorsen			
John Munson			
Spencer Pocock			
Rich + Phyllis Clark			
Nick Chessar			
BOBBY FENN			

MEETING NOTES

PROJECT NUMBER: 2150163.00 ISSUE DATE: 10/14/15
PROJECT NAME: Lam Building D Addition

RECORDED BY: Suzannah Stanley, Land Use Planner
TO: FILE
PRESENT: Peter Alto, Spencer Roedel, Suzannah Stanley – Mackenzie
Attendees—See attached Sign-In Sheet

SUBJECT: Neighborhood Meeting Notes (10/13/15)

INFORMATION ITEMS

1. One attendee, a broker, asked Peter questions about the project. Peter explained the site, project, and campus history.
2. More attendees arrived. The presentation began at 5:09 PM. Peter presented:
 - A. The existing campus contains multiple buildings (sheet A1.0).
 - B. The campus is largely blocked from view from SW Tualatin Road by the berm and vegetation.
 - C. The proposal is for an addition to Building D, positioned between buildings F and C and D. Building F will block the view of the addition from the north (A1.2).
 - D. Building use and layout (A2.1, A2.2).
 - E. The exterior material will be brick veneer to match the existing buildings (rendering, photo). The metal on the top will be similar to the existing building and sky bridge elements. There will be a stair connection to the sky bridge. The metal panels will be consistent with the design language of the existing screens and spandrel glass (A3.1).
3. Suzannah presented information on the Architectural Review and building permit processes, including the public comment and appeal processes.
4. Peter and Lam staff took questions about the project:
 - A. Q: Will the expansion create more noise? A: No, it is an expansion of the existing building and use.
 - B. Q: How long will it be under construction? A: About a year, from spring 2016 to spring 2017.
 - C. Q: How will construction traffic be routed? A: Via the existing access road through the orchard to the east.
 - D. Q: Where will heavy trucks come from? A: They will be routed to the main entries on SW Leveton Drive.

- E. Q: What is the master plan for the campus? A: Potentially to mirror buildings C, D, and F with three new buildings. The Building D expansion is within the existing master plan.
 - F. Q: Will the expansion add employees? A: Yes, about 30.
 - G. Q: What emissions will come from the stacks? A: Those are scrubber stacks, which clean contaminants released by processes. Also, utilities to serve the new building will come from the bridge running north-south through the campus, tied in to the expansion.
 - H. Q: Will the expansion require more parking? A: No, and the proposed expansion will preserve almost all the parking on the site (displacing only a few spaces) north of Building D). The project area is currently mostly grass.
 - I. Q: Does Lam operate three employee shifts? A: Yes.
 - J. Q: How many employees do they currently have? A: Approximately 800-900, across three to four shifts.
 - K. Q: Where does the workforce come from? A: As far south as Salem and as far north as Vancouver.
 - L. Q: How long has Lam been operating at this site? A: About 14 years.
 - M. Q: Where were the operations before? A: San Jose. They relocated some manufacturing and half of their business groups.
 - N. Q: Do they do design work as well [at the Tualatin site]? A: Yes, they design equipment but not chips. The Tualatin campus contains equipment, research and development, and manufacturing functions.
 - O. Q: What the move to Oregon based on costs, or proximity to Intel? A: Both. A lot of factors went into it, about 17 years ago.
 - P. Q: Will the 30 new jobs be net new jobs or relocated? A: New, but they are normal growth for the company.
5. A new attendee arrived and asked two questions:
- A. Q: Will the entrances to the campus remain the same with this project? A: Yes.
 - B. Q: What's in the project area now? A: Mostly grass.
6. Peter presented the project information to the new attendee.
7. The meeting concluded around 5:40 PM.

Enclosure(s): Sign-In Sheet

NOTICE OF NEIGHBORHOOD MEETING

September 28, 2015

Re: **LAM Building D Expansion**

Dear Interested Party:

Mackenzie is representing the owner of the property located at 11355 SW Leveton Drive. We are considering applying for an Architectural Review for the expansion of the existing Building D research and development/lab building at this location.

Prior to applying to the City of Tualatin for the necessary land use approvals, we would like to discuss the proposal in more detail with the surrounding property owners and residents. You are invited to attend a meeting on October 13, 2015 at:

Juanita Pohl Center
8513 SW Tualatin Road
Tualatin, OR 97062
5:00 PM

Please notice this will be an informational meeting on preliminary plans. These plans may be altered prior to the submittal of the application to the City.

We look forward to more specifically discussing the proposal with you. Please call (503) 224-9560 if you have any questions.

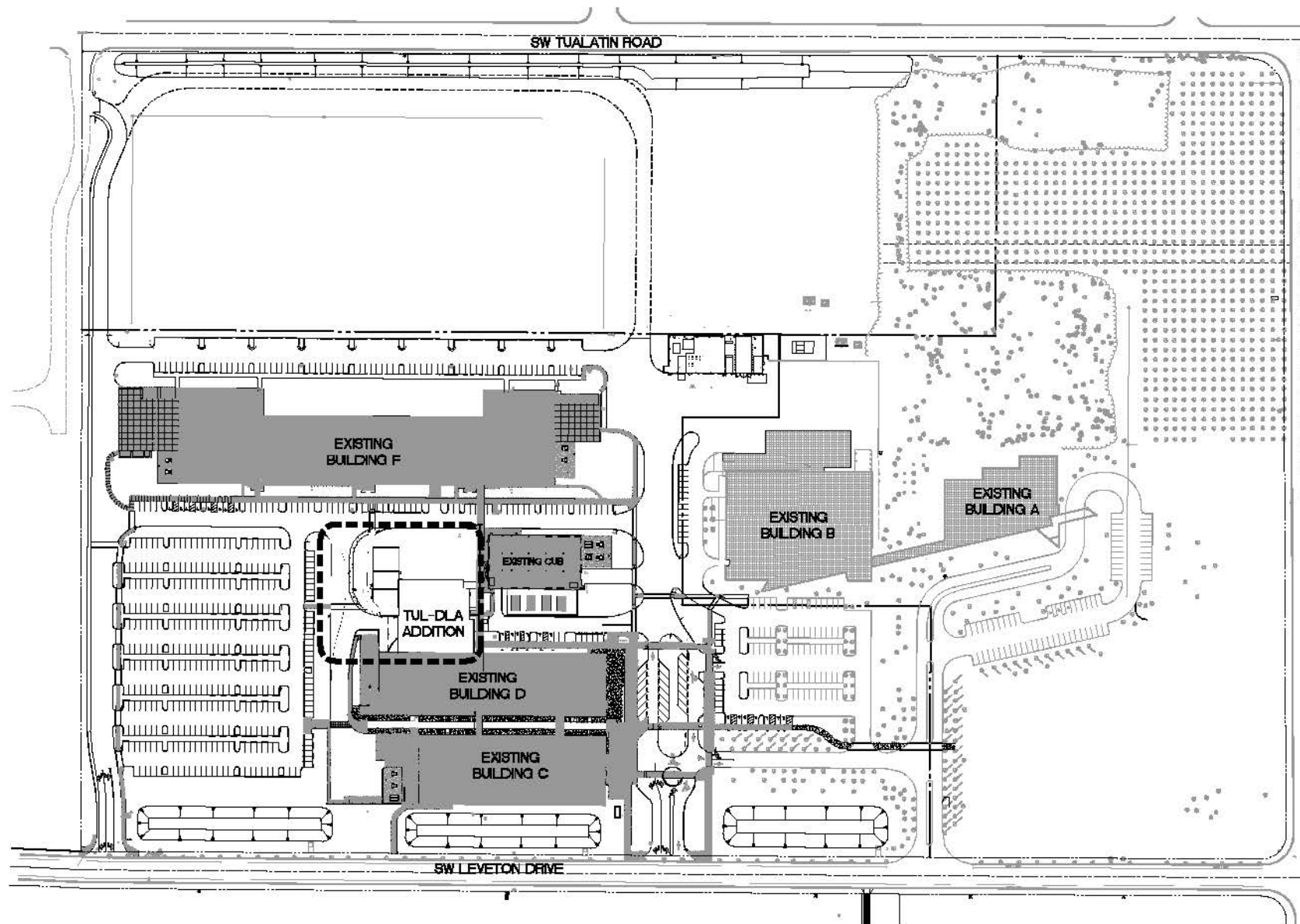
Sincerely,



Lee Leighton
Land Use Planner

Enclosure: Preliminary Site Plan





OVERALL SITE PLAN



M.
Architecture - Interiors
Planning - Engineering

Portland, OR
503.251.8900
Vancouver, WA
360.683.0700
Seattle, WA
206.468.0000
www.mackenzie.com

MACKENZIE.

Client

Lam
RESEARCH

Project
**DLA TUALATIN
BUILDING D
ADDITION**

11857 SW LEVETON DR
TUALATIN, OR 97062

DATE: 8/26/2015
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WITHOUT PRIOR WRITTEN PERMISSION

REVISIONS:

BY: JENNYA REWIND DATE:
DATE: 8/26/2015

SHEET TITLE:

**OVERALL
SITE PLAN**

DRAWN BY: ELI

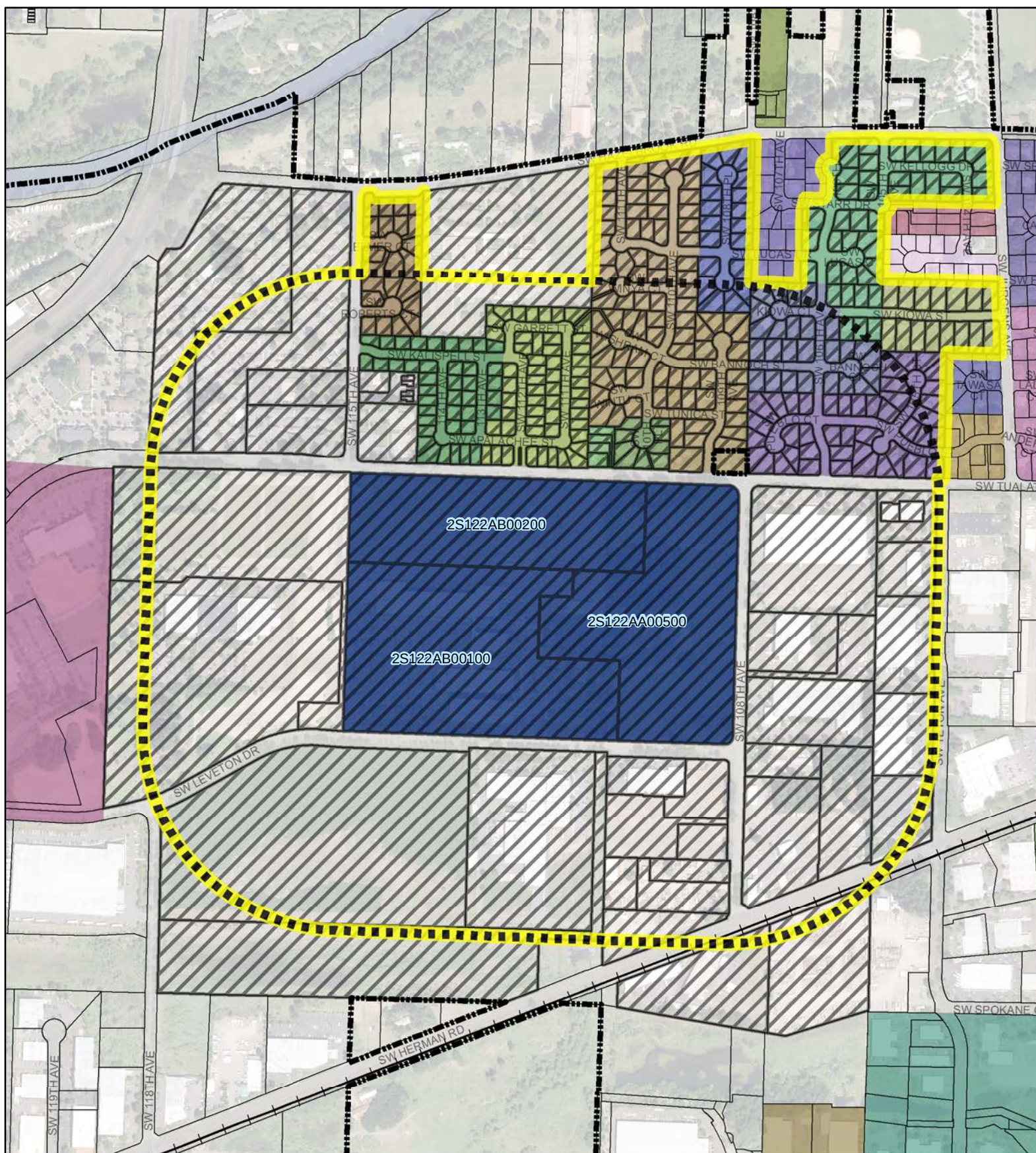
CHECKED BY: PPA

SHEET:

A1.0

JOB NO. 2150163.00

PRELIMINARY ONLY - 9/28/15



1000' Buffer

1000' Buffer with Subdivisions



Selected Taxlots



AR-15-0029

To lessen the bulk of the notice of application and to address privacy concerns, this sheet substitutes for the photocopy of the mailing labels. A copy is available upon request.