DOWL

MEMORANDUM

TO:	City of Keizer Engineering Department
FROM:	Mike Towle, PE
DATE:	December 8, 2020
SUBJECT:	Chemawa Station Stormwater Design – Chick-fil-A Update

This memo outlines the proposed changes to the stormwater management facilities at the Chemawa Station development, originally designed by Westech Engineering in 2019.

The original site layout shows two buildings on the west side of the development, with a shared parking area between them. This site layout was approved in early 2020, and the mass grading and utility work was done during the summer. As builts were submitted for this work on October 1, 2020 (See Attachments: Pages from Phase II: Final Grading, Drainage & Utilities Chemawa Station – "Area D").

The proposed Chick-fil-A (CFA) site plan has modified the original site plan for the west side of the Chemawa Station development (referred to as "Basin West" by Westech). The building originally shown on the northwest side of the site has been moved to the west end of Basin West. The building originally shown on the southwest side of the site has been removed (See Attachments: Figure 2 – Proposed Conditions).

Due to this updated site plan, the previously installed stormwater treatment and detention facilities need to be relocated since they are now conflicting with the proposed building location. The stormwater design was checked to confirm the facility sizing is correct per the modified site plan. The original storm report was provided by Westech Engineering and was used to compare the new site conditions to the original design for this area.

The original design for the treatment and detention systems accounts for 1.76 ac of impervious area in Basin West. The proposed changes to the original design due to the new CFA layout results in 1.44 ac of impervious area within Basin West.

The new CFA layout has less impervious area than the original site layout, which means the water quality flow from the Basin West area decreased and the release rates from the detention system decreased. Therefore, the treatment and detention systems are adequately sized, and no additional filter cartridges or chambers are needed.

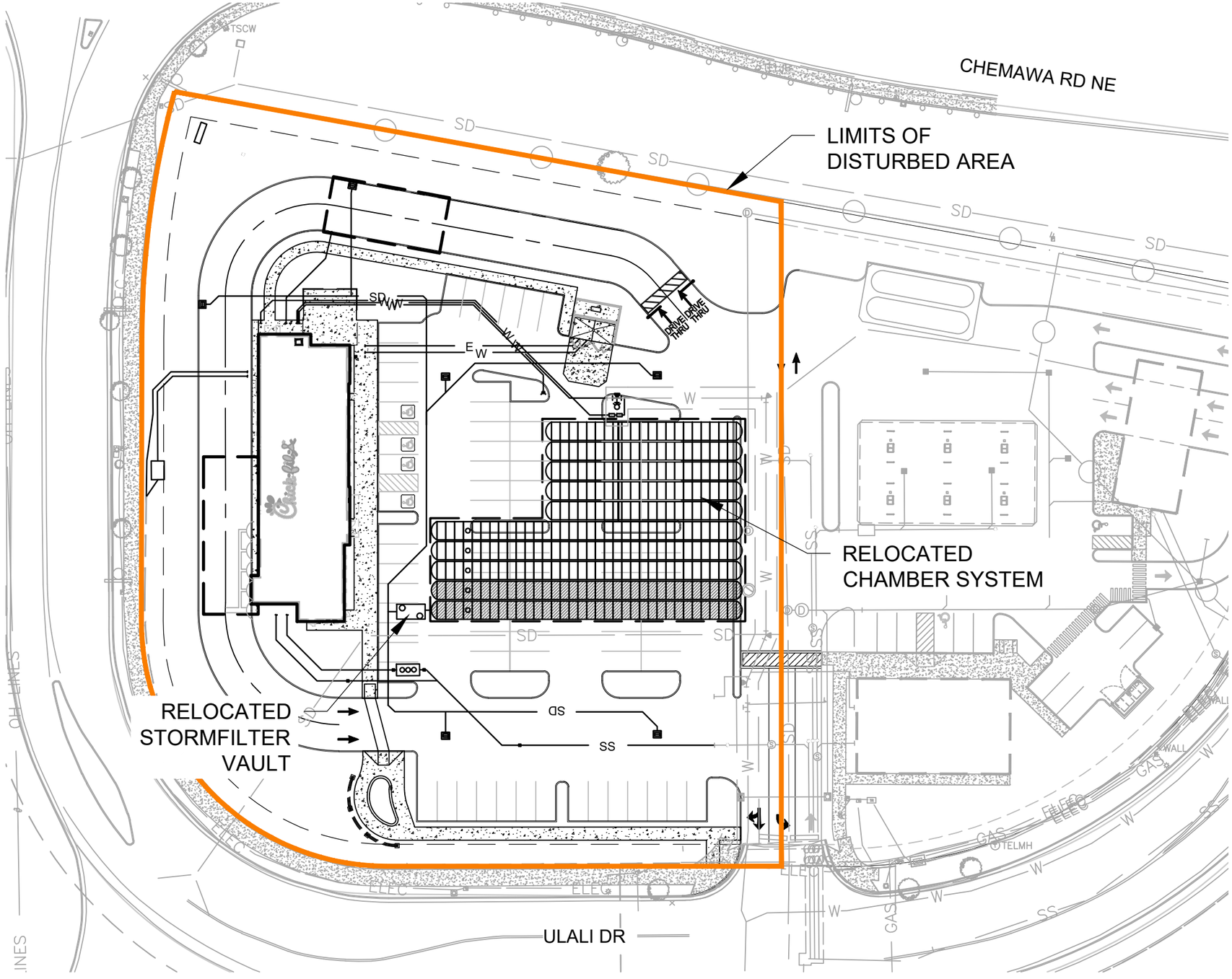
The attached exhibit shows the proposed new layout for the filter vault and chamber system. Please note, the final layout of these facilities is to be determined during the construction phase.

Please feel free to contact me with any questions.

Mike Towle, PE

Attachments:

- Figure 2: Proposed Conditions
- Pages from Phase II: Final Grading, Drainage & Utilities Chemawa Station "Area D" – October 2020.
- Pages from Stormwater Calculations Chemawa Station – August 2019.



Site Condition	Impervious Area (ac)	Pervious Area (ac)	Total Area (ac)
Proposed	1.44	0.70	2.14

50 0 50

SCALE IN FEET

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

CHICK-FIL-A KEIZER
PROPOSED CONDITIONS
KEIZER, OREGON

PROJECT 14707
DATE 12/08/2020

FIGURE 2

DRAWINGS FOR:

PHASE II: FINAL GRADING, DRAINAGE & UTILITIES CHEMAWA STATION-"AREA D" ULALI DR, KEIZER, OR

FOR:

CHEMAWA STATION, LLC
9400 SW BEAVERTON-HILLSDALE HWY, STE. 131-A
BEAVERTON, OREGON 97005

811
Know what's **below.**
Call before you dig.

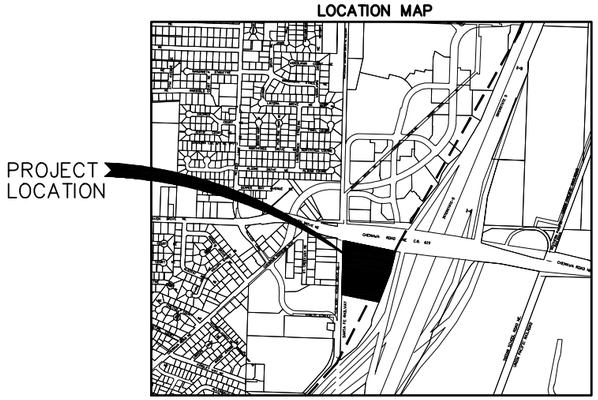
WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.00000.0

REGISTERED PROFESSIONAL ENGINEER
76415PE
OREGON
JULY 12, 2005
WILLIAM M. KEITS
RENEWS: 6/30/2022

AS-CONSTRUCTED

Chemawa Station - Area 'D'
Ulali Drive | Keizer, Oregon
Chemawa Station LLC

LOCATION MAP



PROJECT NO.

DRAWN BY :
AK
CHECKED BY :
JW
DATE :
6-12-19
REVISION :
1. 7.22.19 AK
PER CITY COMMENTS
2. 10.6.19 AK
PER CITY COMMENTS
3. 1.22.20 AK
PER OLDC. COMMENTS
4. 3.25.20 AK
COORDINATION W/ CFA
5. 4.15.20 AK
PER CITY COMMENTS
6.

c1.0 cover

SHEET INDEX

AS-BUILT

COMPILED FROM:

FINAL PROOF SURVEY ____
DATA FURNISHED BY CONTRACTOR X
FIELD INSPECTION RECORDS ____

WESTECH ENGINEERING, INC.

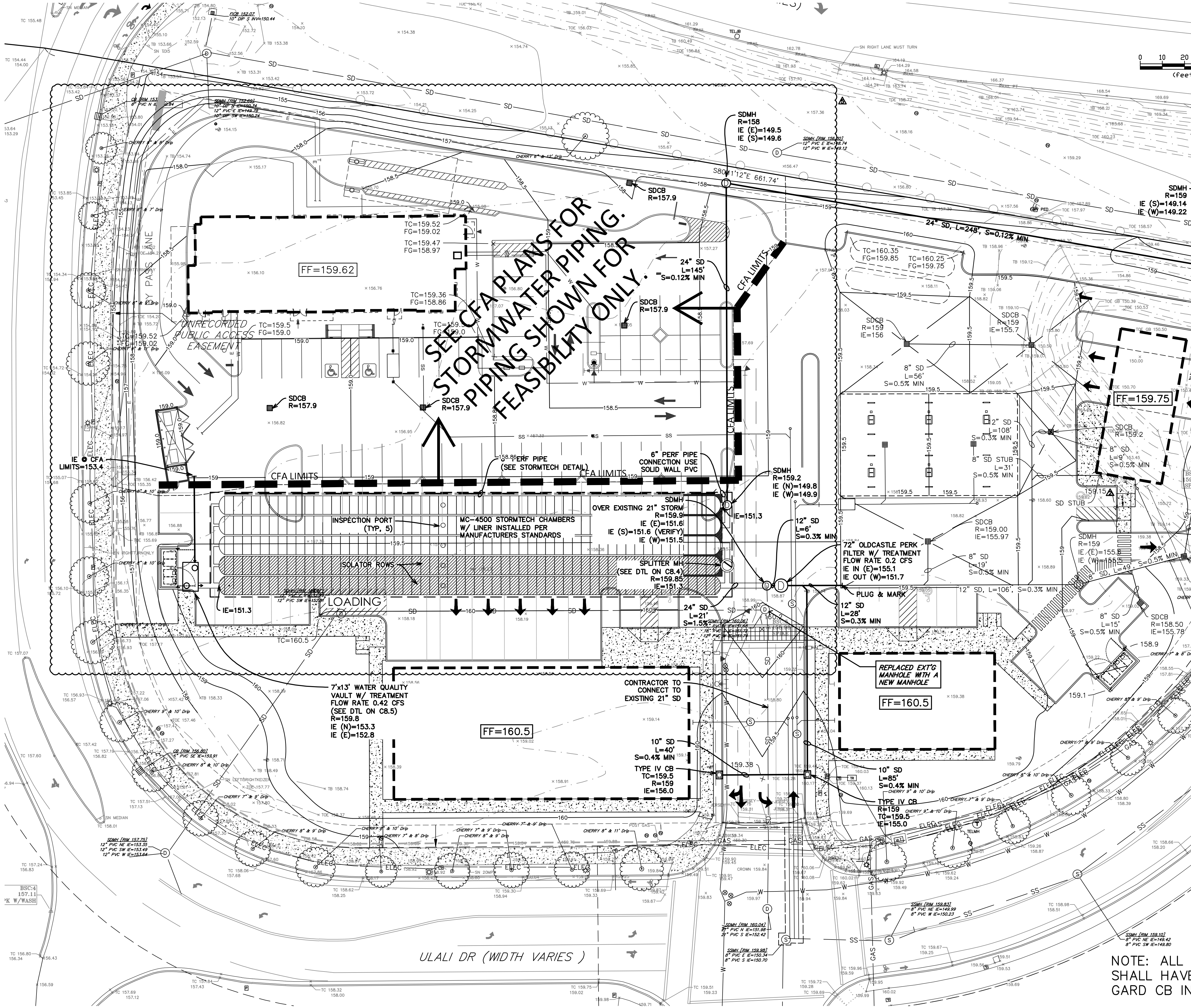
DATE: 10.1.20 *BY:* AK

BSAA
ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

COVER

C0.0

c:\users\cad\desktop\work (pc)\projects\area d-3150.0000.0\civil\plots\c1.0 cover.dwg, plotted: 10/1/2020 3:57:04 PM



AS-BUILT

COMPILED FROM:

FINAL PROOF SURVEY ____
DATA FURNISHED BY CONTRACTOR X
FIELD INSPECTION RECORDS ____

WESTECH ENGINEERING, INC.

DATE: 10.1.20 BY: AK

NOTE: ALL CATCH BASINS SHALL HAVE OLDCASTLE FLO GARD CB INSERTS PER DETAILS

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.0000.0

REGISTERED PROFESSIONAL ENGINEER
76415PE
OREGON
NOV. 12, 2008
WILLIAM J. WELLS
AS-CONSTRUCTED
RENEWS: 6/30/2022

Chemawa Station - Area 'D'

Ulali Drive | Keizer, Oregon

Chemawa Station LLC

PROJECT NO.

DRAWN BY : AK

CHECKED BY : JW

DATE : 6-12-19

REVISION :

1. 7.22.19 AK PER CITY COMMENTS
2. 10.6.19 AK PER CITY COMMENTS
3. 1.22.20 AK PER ODLC. COMMENTS
4. 3.25.20 AK COORDINATION W/ CFA
5. 4.15.20 AK PER CITY COMMENTS
6.

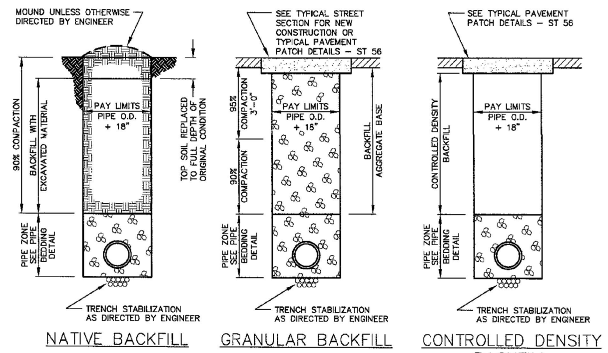
overall grading plan

BSAA
ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES
ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

OVERALL DRAINAGE PLAN

C4.1

c:\users\cad\desktop\work (pc)\projects\area d-3150.0000.0\civil\plots\overall grading plan.dwg, plotted: 10/1/2020 3:59:35 PM



NATIVE BACKFILL

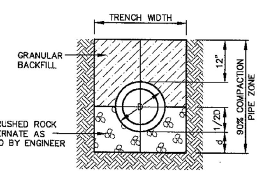
GRANULAR BACKFILL

CONTROLLED DENSITY BACKFILL

CONTROLLED DENSITY BACKFILL SHALL BE USED IN ALL EXIST. PAVED STREETS IF THE TRENCH MEETS ONE OR MORE OF THE FOLLOWING CRITERIA:
1. TRENCH DEPTH IS 5' OR LESS (SURFACE TO INV.)
2. TRENCH WIDTH IS 12" OR LESS
3. TRENCH LENGTH IS 50' OR LESS

IF REQUIRED, POLYWRAP PIPE IN ACCORDANCE WITH POLYWRAP DETAIL W-32

TRENCH BACKFILL DETAIL
NTS



D = OUTSIDE DIAMETER
d = DEPTH OF BEDDING MATERIAL BELOW PIPE

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d
12" & SMALLER	6"
15" – 36"	8"
42" & LARGER	10"

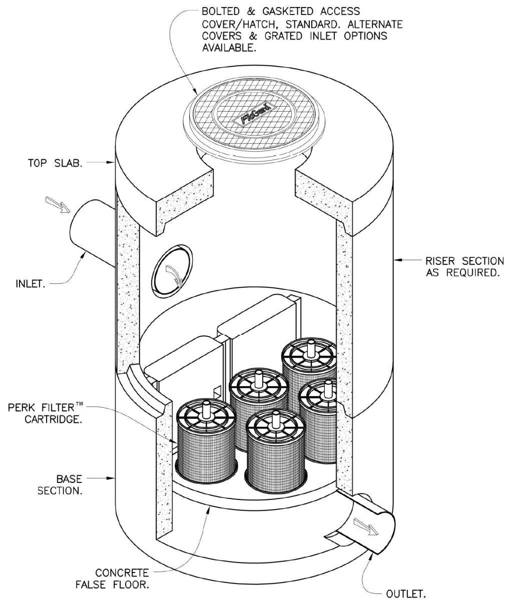
NOTE:
WHERE DIRECTED BY THE ENGINEER, TRENCH STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF BEDDING. SIZE & DEPTH ARE DEPENDENT ON SOIL CONDITIONS.
FOR ROCK OR OTHER INCOMPRESSIBLE MATERIALS, TRENCH SHALL BE OVER EXCAVATED A MIN. OF 6" & REFILLED WITH GRANULAR MATERIAL AS DIRECTED BY THE ENGINEER.
BEDDING & BACKFILL MATERIALS IN PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.

1. REVISED AS PER CITY OF KEIZER REVIEW 09-23-08

CITY OF KEIZER 1982

STANDARD DETAIL DRAWING
TRENCH DETAILS FOR WATER MAINS
DRAWN: J.M.M. | DATE: 1-24-00
APPROVED: W.I.P. | NUMBER: W-30

PF-MH-72



Notes:

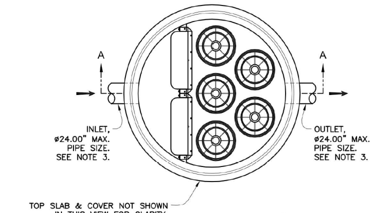
1. Precast concrete structure shall be manufactured in accordance with ASTM Designation C478.
2. Filter system shall be supplied with traffic rated (H20) bolted & gasketed Ø36" circular access covers with risers as required. Field poured concrete collar required, by others.
3. Inlet & outlet pipe(s) are to be Ø24.00" maximum. Inlet pipes must enter the structure in the inlet bay.
4. Inlet chamber shall be supplied with drain-down device designed to remove standing water between storm events.
5. Minimum separation between invert in & invert out is outlet pipe diameter plus 4.00".
6. For depths less than specified minimums contact Oldcastle® Stormwater Solutions for engineering assistance.

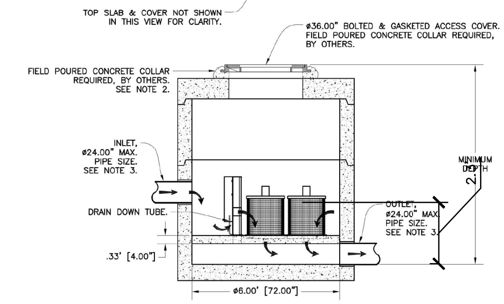
Perk Filter™
Ø72.00" Manhole
One to Five Cartridges / Stacks
Media Filtration

Oldcastle® Stormwater Solutions
7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO. PF-MH-72 | REV NR | ECO ECO-0118 ISM 1/26/15 | DATE ISM 1/26/15 | SHEET 1 OF 2

PF-MH-72





SECTION A-A

Minimum Depth								
PIPE SIZE	Ø6.00"	Ø8.00"	Ø10.00"	Ø12.00"	Ø15.00"	Ø18.00"	Ø21.00"	Ø24.00"
CARTRIDGE TYPE	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET	MINIMUM DEPTH RIM TO OUTLET
12"	4.08' [49.00"]	4.08' [49.00"]	4.33' [52.00"]	4.58' [55.00"]	4.83' [58.00"]	5.08' [61.00"]	5.33' [64.00"]	5.58' [67.00"]
18"	4.83' [58.00"]	4.83' [58.00"]	5.08' [61.00"]	5.33' [64.00"]	5.58' [67.00"]	5.83' [70.00"]	6.08' [73.00"]	6.33' [76.00"]
12" + 12"	5.58' [67.00"]	5.83' [70.00"]	6.08' [73.00"]	6.33' [76.00"]	6.58' [79.00"]	6.83' [82.00"]	7.08' [85.00"]	7.33' [88.00"]
12" + 18"	6.08' [73.00"]	6.33' [76.00"]	6.58' [79.00"]	6.83' [82.00"]	7.08' [85.00"]	7.33' [88.00"]	7.58' [91.00"]	7.83' [94.00"]

Ø72.00" PERK FILTER MANHOLE
TREATMENT FLOW RATES, TOTAL FLOW CAPACITIES & MAXIMUM HEAD LOSS

CARTRIDGE STACK QUANTITY	CARTRIDGE STACK CONFIGURATION							
	12"		18"		12" & 12"		12" & 18"	
	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)	TREATMENT FLOW RATE (GPM / CFS)	TOTAL FLOW CAPACITY (CFS)
1	12 / 0.03	4.94	18 / 0.04	6.10	24 / 0.05	6.90	30 / 0.07	7.24
2	24 / 0.06	4.94	36 / 0.08	6.10	48 / 0.11	6.90	60 / 0.13	7.24
3	36 / 0.09	4.94	54 / 0.12	6.10	72 / 0.15	6.90	90 / 0.21	7.24
4	48 / 0.12	4.94	72 / 0.16	6.10	96 / 0.20	6.90	120 / 0.28	7.24
5	60 / 0.15	4.94	90 / 0.20	6.10	120 / 0.25	6.90	150 / 0.35	7.24
MAXIMUM HEAD LOSS	1.7 FEET		2.3 FEET		2.9 FEET		3.5 FEET	

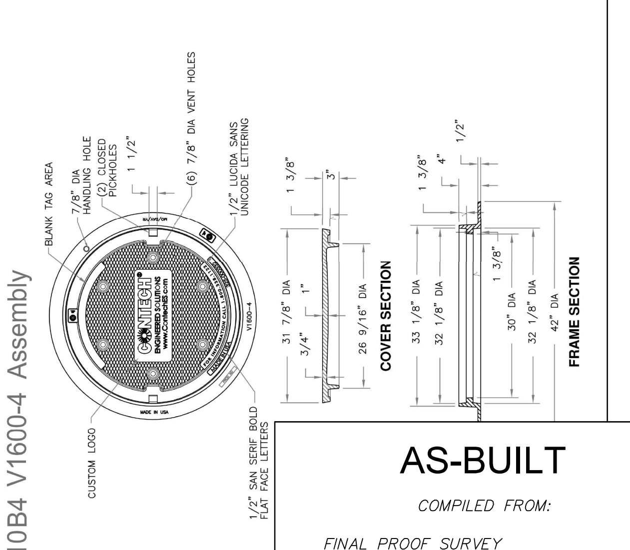
Perk Filter™
Ø72.00" Manhole
One to Five Cartridges / Stacks
Media Filtration

Oldcastle® Stormwater Solutions
7921 Southpark Plaza, Suite 200 | Littleton, CO | 80120 | Ph: 800.579.8819 | oldcastlestormwater.com

DRAWING NO. PF-MH-72 | REV NR | ECO ECO-0118 ISM 1/26/15 | DATE ISM 1/26/15 | SHEET 2 OF 2

4

1810B4 V1600-4 Assembly



ej
Product Number
41600484
Design Features
-Materials
Cover
Gray Iron (CL35B)
Frame
Gray Iron (CL35B)
-Design Load
Heavy Duty
-Open Area
n/a
-Coating
Undipped
-√ Designates Machined Surface

Certification
-
- ASTM A48
-
-Country of Origin:USA

Major Components
00180783
41600419

Drawing Revision
11/19/2007 Designer: DEW
6/20/2017 Revised By: DAE

Disclaimer
Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

Contact
800 626 4653
ejco.com

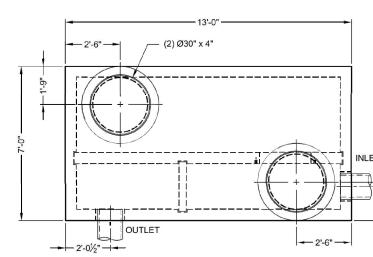
AS-BUILT

COMPILED FROM:

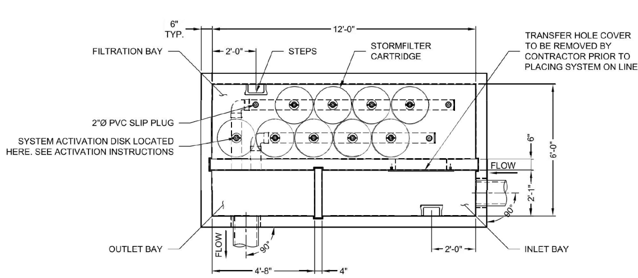
FINAL PROOF SURVEY ____
DATA FURNISHED BY CONTRACTOR X
FIELD INSPECTION RECORDS ____

WESTECH ENGINEERING, INC.

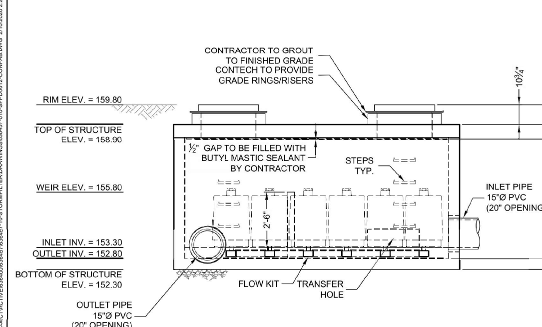
DATE: 10.1.20 *BY:* AK



PLAN VIEW



PLAN VIEW (TOP SLAB NOT SHOWN)



ELEVATION VIEW

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
9	27", ZPG CARTRIDGE	CONTECH
12	RESTRICTOR DISK (GLD), 22.5 GPM	CONTECH
3	2"Ø PVC SLIP PLUG	CONTECH
1	FLOW KIT (51R)	CONTECH
1	36" x 14" TRANSFER HOLE COVER	CONTECH
1	JOINT SEALANT	CONTRACTOR
2 PLCS	Ø48" RISERS WITH TOP SLABS	CONTRACTOR
2	Ø30" x 4" EJ #41600484, OR EQUIVALENT FRAME AND COVER	CONTRACTOR
8	STEPS, P10CTS LANE LADDER, OR EQUIVALENT	CONTECH
1	STORMFILTER ACTIVATION DISK	CONTECH

SITE DESIGN DATA

WATER QUALITY FLOW RATE	0.42 CFS
PEAK FLOW RATE	N/A CFS
RETURN PERIOD OF PEAK FLOW	N/A YRS
FILTER MEDIA TYPE	ZPG

PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **38 SECONDS**.
SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 1' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING WITH ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL
B. BE SPECIFIED BY ENGINEER OF RECORD.
C. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
D. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
E. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
G. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 34,500 LBS OF 2 PIECES
BASE SECTION SHIPPED WITH CARTRIDGES INSTALLED

MAX FOOTPRINT = 7' x 13'

CONTECH **CONTRACT** DRAWING

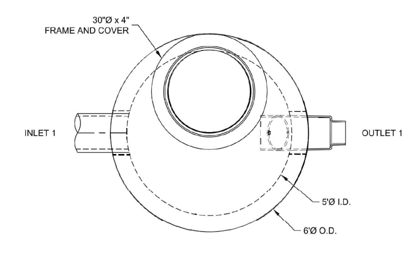
CUZ
LAYOUT LAYOUT 2
CLASS 600
5784 / CUZ001

STORMFILTER PEAK DIVERSION - SFPD0612 636457-010
CHEMAWA STATION - AREA D
KEIZER, OR
for SYSTEM: WEST TREATMENT ALTERNATE

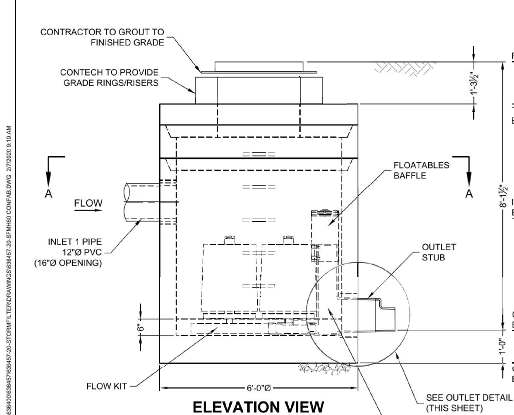
MARK | DATE | REVISION DESCRIPTION | BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
11815 NE Glenn Widing Drive, Portland, OR 97220
503-240-3393 800-561-1271 FAX
StormFilter®

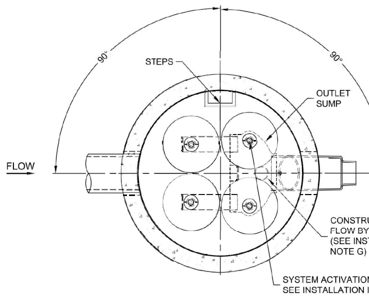
DATE: 02/10/2020
DESIGNED: DLG | DRAWN: RRB
CHECKED: DLG | APPROVED: DLG
PROJECT No.: 636457 | SEQUENCE No.: 010
SHEET: 1 OF 1



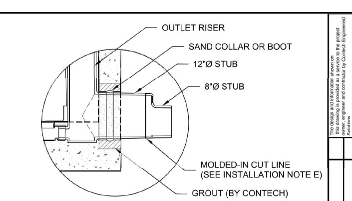
PLAN VIEW
CARTRIDGES AND FLOW KIT NOT SHOWN



ELEVATION VIEW



SECTION A-A



OUTLET DETAIL
(ILLUSTRATION ONLY)

MATERIAL LIST (PROVIDED BY CONTECH)

COUNT	DESCRIPTION	INSTALLED BY
4	27" ZPG CARTRIDGE	CONTECH
4	22.5 GPM RESTRICTOR DISK (GLD)	CONTECH
1	41A FLOWKIT	CONTECH
1	SF ACTIVATION DISK	CONTECH
1	27" OUTLET RISER ASSEMBLY	CONTECH
5	STEPS, P10CTS, LANE LADDER, OR EQUIV.	CONTECH
1	SEALANT FOR JOINTS	CONTRACTOR
1 PLC	GRADE RINGS/RISERS	CONTRACTOR
1	30"Ø x 4" FRAME & COVER, EJ#41600484, OR EQUIV.	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	0.2 CFS
FILTER MEDIA TYPE	ZPG

PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES.** FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **38 SECONDS.**
SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES
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2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS *SHALL MEET AASHTO M306 LOAD* RATING AND BE CAST WITH THE CONTECH LOGO.
5. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S). ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
G. CONTRACTOR TO INSTALL SUPPLIED PLUG IN CONSTRUCTION FLOW BYPASS WHEN SYSTEM IS BROUGHT ON LINE (PRESSURE FIT ONLY, DO NOT GLUE).

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 13000 LBS. OF 3 PIECES
BASE SECTION SHIPPED WITH CARTRIDGES INSTALLED
MAX FOOTPRINT = Ø6'

CONTECH **CONTRACT** DRAWING

CA88928
LAYOUT 2A
5764 / CASC

STORMFILTER SFMH60 - 636457-20
CHEMAWA STATION - AREA D
KEIZER, OR
for SYSTEM: EAST TREATMENT ALTERNATE

MARK | DATE | REVISION DESCRIPTION | BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX
StormFilter®

DATE: 02/07/20 | SCALE: 3/8" = 1'-0"
DESIGNED: DLG | DRAWN: JLS
CHECKED: DLG | APPROVED:
PROJECT No.: 636457 | SEQUENCE No.: 20
SHEET: 1 OF 1

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.0000.0

REGISTERED PROFESSIONAL ENGINEER
76415PE
OREGON
NOV. 12, 2008
WILLIAM J. WELLS
AS-CONSTRUCTED
RENEWS: 6/30/2022

Chemawa Station - Area 'D'

Ulali Drive | Keizer, Oregon

Chemawa Station LLC

PROJECT NO.

DRAWN BY :
AK
CHECKED BY :
JW
DATE :
6-12-19
REVISION :
1. 7.22.19 AK PER CITY COMMENTS
2.
3.
4. 3.25.20 AK COORDINATION W/ CFA
5.
6.

details

BSAA
ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

CONSTRUCTION DETAILS

C8.5

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ADVANCED DRAINAGE SYSTEMS, INC.

SiteASSIST by StormTech
FOR STORMTECH INSTRUCTIONS, DOWNLOAD THE INSTALLATION APP

Area D
Keizer

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTITIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.^J
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".^J
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS.
   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.^J
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.^J
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.^J
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.^J
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

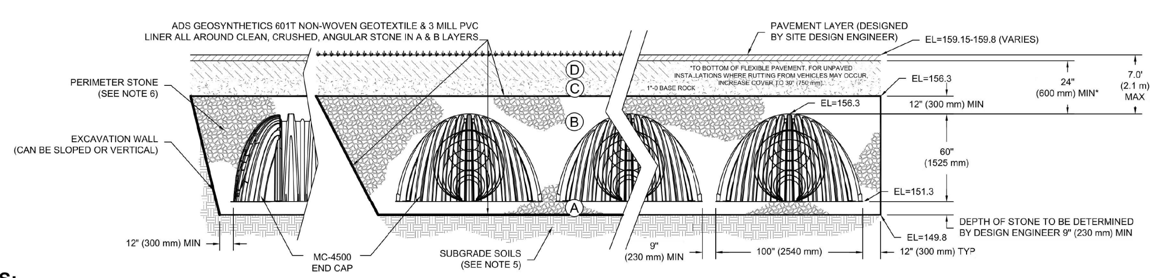
1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".^J
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.^J
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.		**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4
D	A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4 NO COMPACTION REQUIRED.
PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2 3]	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.		

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. MC-4500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".^J
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".^J
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.^J
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.^J
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.^J
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

Area D Keizer	DATE: 11/30/2018	DRAWN: WW	
	PROJECT #: Tool	CHECKED: ---	
REV	DRW	CHK	DESCRIPTION

ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473
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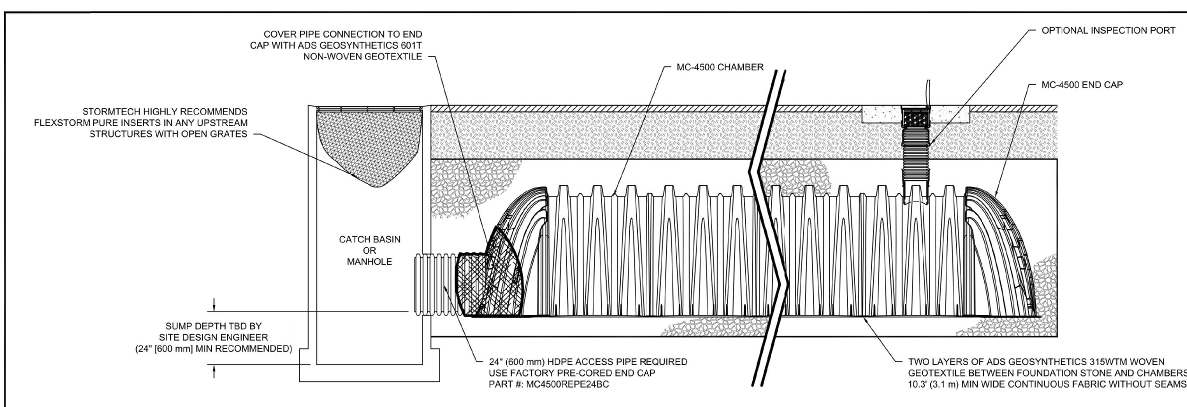
SHEET 3 OF 6



MC-4500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE^Ji) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY^Jii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

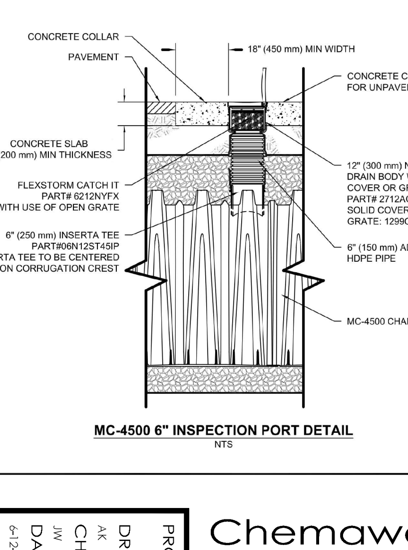
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.^J
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-4500 6" INSPECTION PORT DETAIL
NTS

Area D Keizer	DATE: 11/30/2018	DRAWN: WW	
	PROJECT #: Tool	CHECKED: ---	
REV	DRW	CHK	DESCRIPTION

ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473
StormTech® Detention • Retention • Water Quality 70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067 860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

SHEET 4 OF 6

AS-BUILT
COMPILED FROM:
FINAL PROOF SURVEY ____
DATA FURNISHED BY CONTRACTOR X
FIELD INSPECTION RECORDS ____
WESTECH ENGINEERING, INC.
DATE: 10.1.20 BY: AK

WESTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.0000.0

REGISTERED PROFESSIONAL ENGINEER 76415PE OREGON NOV. 12, 2008 WILLIAM J. WELLS AS-CONSTRUCTED RENEWS: 6/30/2022

Chemawa Station - Area 'D'
Ulali Drive | Keizer, Oregon
Chemawa Station LLC

PROJECT NO.
DRAWN BY : AK
CHECKED BY : JW
DATE : 6-12-19
REVISION :
1. 7.22.19 AK PER CITY COMMENTS
2.
3.
4.
5.
6.
details

BSAA ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

CONSTRUCTION DETAILS
C8.6

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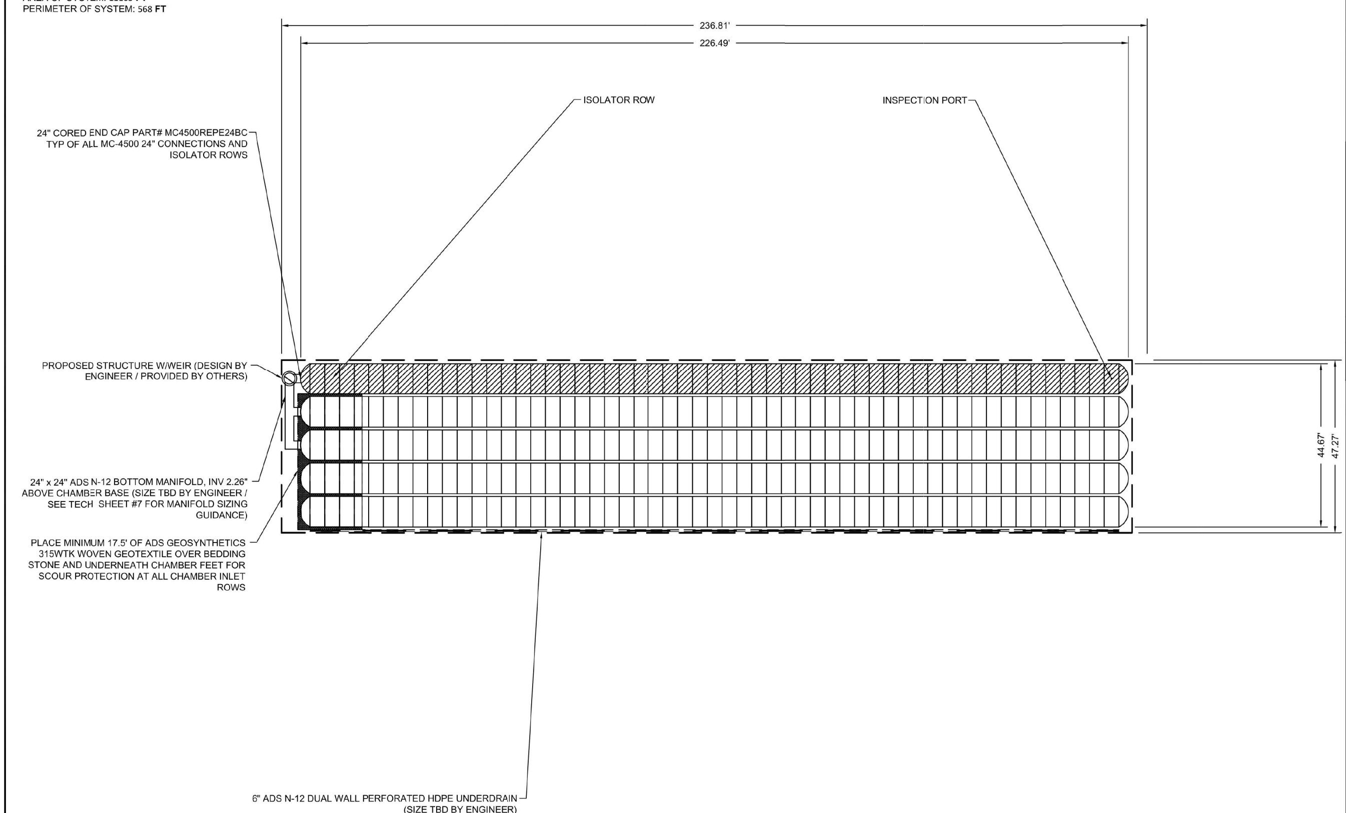
COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION

CONCEPTUAL LAYOUT
(275) STORMTECH MC-4500 CHAMBERS
(10) STORMTECH MC-4500 END CAPS
INSTALLED WITH 12 " COVER STONE, 18 " BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 51103 CF
AREA OF SYSTEM: 11105 **FT²**
PERIMETER OF SYSTEM: 568 **FT**



ADS ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473

NOT TO SCALE

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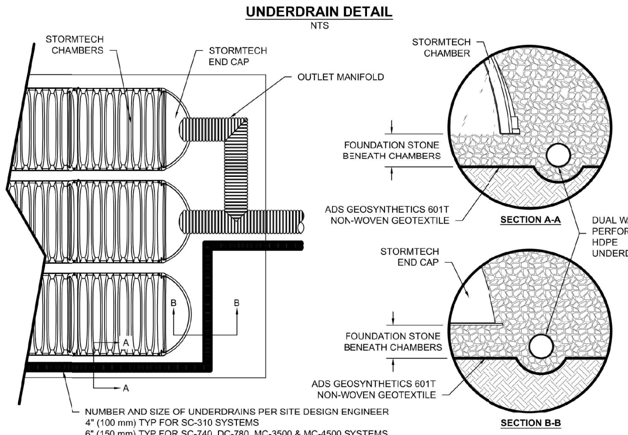
REV	DRW	CHK	DESCRIPTION

Area D
Keizer

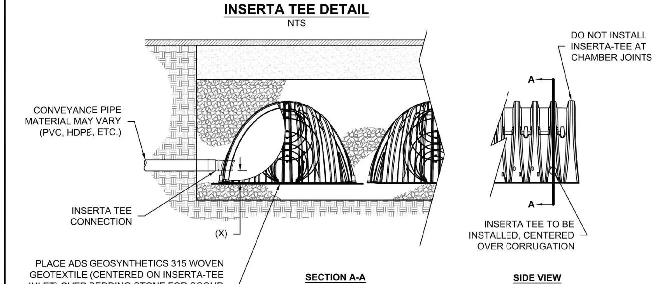
DATE: 11/30/2018 DRAWN: WW
PROJECT #: Tool CHECKED: ---

SHEET 2 OF 6

UNDERDRAIN DETAIL
NTS



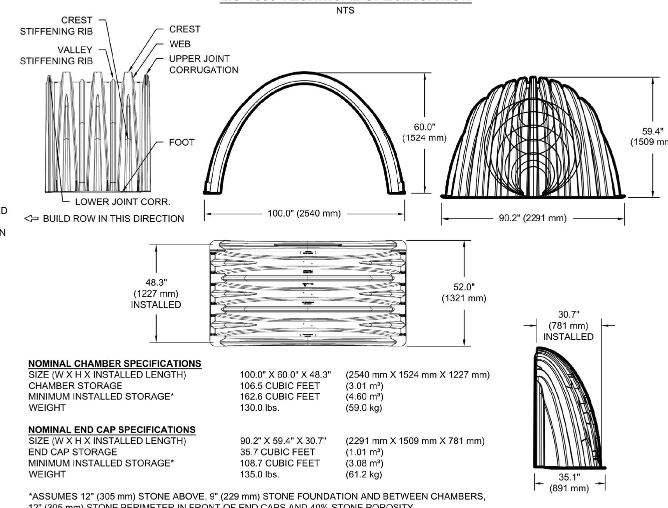
INSERTA TEE DETAIL
NTS



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS.
CONTACT STORMTECH FOR MORE INFORMATION.

MC-4500 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT	130.0 lbs.	(59.0 kg)

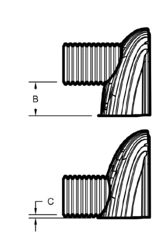
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.2" X 59.4" X 30.7"	(2291 mm X 1509 mm X 781 mm)
END CAP STORAGE	35.7 CUBIC FEET	(1.01 m³)
MINIMUM INSTALLED STORAGE*	108.7 CUBIC FEET	(3.08 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC4500REPE06T	6" (150 mm)	42.54" (1.081 m)	---
MC4500REPE06B		---	0.86" (22 mm)
MC4500REPE08T	8" (200 mm)	40.50" (1.029 m)	---
MC4500REPE08B		---	1.01" (26 mm)
MC4500REPE10T	10" (250 mm)	38.37" (975 mm)	---
MC4500REPE10B		---	1.33" (34 mm)
MC4500REPE12T	12" (300 mm)	35.69" (907 mm)	---
MC4500REPE12B		---	1.55" (39 mm)
MC4500REPE15T	15" (375 mm)	32.72" (831 mm)	---
MC4500REPE15B		---	1.70" (43 mm)
MC4500REPE18TC	18" (450 mm)	29.36" (746 mm)	---
MC4500REPE18BC		---	1.97" (50 mm)
MC4500REPE24TC	24" (600 mm)	23.05" (585 mm)	---
MC4500REPE24BC		---	2.26" (57 mm)
MC4500REPE30BC	30" (750 mm)	---	2.95" (75 mm)
MC4500REPE36BC	36" (900 mm)	---	3.25" (83 mm)
MC4500REPE42BC	42" (1050 mm)	---	3.55" (90 mm)



NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.

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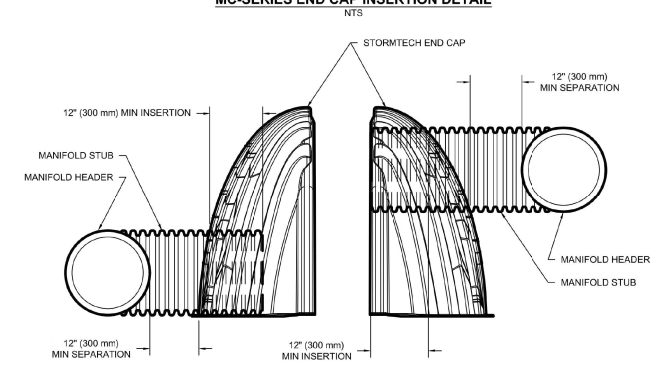
REV DRW CHK DESCRIPTION
Area D
Keizer
DATE: 11/30/2018 DRAWN: WW
PROJECT #: Tool CHECKED: ---
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

SHEET 5 OF 6

MC-SERIES END CAP INSERTION DETAIL
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

ADS ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473
StormTech® Detention • Retention • Water Quality 70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067 860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM
REV DRW CHK DESCRIPTION
Area D
Keizer
DATE: 11/30/2018 DRAWN: WW
PROJECT #: Tool CHECKED: ---
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

SHEET 6 OF 6

AS-BUILT
COMPILED FROM:
FINAL PROOF SURVEY ____
DATA FURNISHED BY CONTRACTOR X
FIELD INSPECTION RECORDS ____
WESTECH ENGINEERING, INC.
DATE: 10.1.20 BY: AK

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.0000.0

REGISTERED PROFESSIONAL ENGINEER 76415PE OREGON NOV. 12, 2008 WILLIAM J. WELLS
AS-CONSTRUCTED
RENEWS: 6/30/2022

Chemawa Station - Area 'D'
Ulali Drive | Keizer, Oregon
Chemawa Station LLC

PROJECT NO.
DRAWN BY : AK
CHECKED BY : JW
DATE : 6-12-19
REVISION :
1. 7.22.19 AK PER CITY COMMENTS
2.
3.
4.
5.
6.
details

BSAA ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

CONSTRUCTION DETAILS
C8.7

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Westech Engineering, Inc.
3841 Fairview Industrial Drive SE, Suite 100
Salem, OR 97302
(503) 585-2474 FAX: (503) 585-3986

August 6, 2019

City of Keizer
930 Chemawa Rd NE
Keizer, OR 97303

RE: Stormwater Calculations – Chemawa Station, LLC
JO# 3150.0000.0

To Whom It May Concern:

Westech Engineering submits this Stormwater Calculations Summary for the Chemawa Station development project in Keizer, Oregon.

The remainder of this letter is divided into the following sections:

- Project Overview
- Summary of Methods
- Analysis Results
- Stormwater Basin Map & Water Quality Basin Map
- Keizer Station Basin & Flow Map
- Appendix A – HydroCAD Model Analysis
- Appendix B – Geotechnical Report

Short discussions on these items follow.

Project Overview and Existing Conditions

The proposed project is located just south of Keizer Station, bounded between Ulali Dr to the south and Chemawa Road to the north (Refer to Stormwater Basin Map, Basin A). The project scope is to develop a commercial retail shopping center with associated utilities, parking and provide detention for the entire Chemawa Station property (drainage area is approximately 21.69 acres, Basin A, B & C). Refer to the Civil Drawings for a site map of the project area.

The existing site is located within the Keizer Station management area as shown on the attached Keizer Station Stormwater Basin Map and Allowed Developed Flows. The allowed release rates to the Keizer Station stormwater system are as follows in Table 1.

Table 1 – Keizer Station Post Developed Allowable Detention Release Rates

Flow Return Storm Event	Allowable Detention Release Rates (CFS)
5 yr	4.48
10 yr	6.05
25 yr	8.00
50 yr	9.82
100 yr	10.22

This project will fill the existing detention pond located in Basin A and replace it with an underground detention system that will provide detention for both Basin A, Basin B, and the undetained Basin C at full buildout.

Summary of Methods

Software Used

HydroCAD modeling software was used to size the stormwater detention facility. The Santa Barbara Unit Hydrograph Type 1A storm was used to model the design storm, the same as the Keizer Station Stormwater Master Plan. HydroCAD modeling analysis is included in Appendix A.

24 hour Rainfall Depths

The 24-hour storm depths used for the model where the same depths used in the Keizer Station Master Plan. These are shown as follows in Table 2.

Table 2 – Keizer Station Master Plan 24hr Storm Depths

Flow Return Storm Event	Storm Depth (inches)
Water Quality	1.05
5 yr	3.0
10 yr	3.45
25 yr	3.98
50 yr	4.45
100 yr	4.55

Curve Numbers and Time of Concentration

Developed curve numbers of 98 and 74 were used for the buildings/impervious surface and landscaping, respectively. These CN's are consistent with the Keizer Station Master Plan

A minimum time of concentration of 10 minutes is applied to the developed basins in order to be consistent with the Keizer Station Stormwater Master Plan.

Drainage Basin

Refer to the Stormwater Basin Map. There are three developed (at buildout) drainage basins as shown in Table 3.

Table 3 - Drainage Basin Areas

Drainage Basin	Impervious Area (AC)	Pervious Area (AC)
Basin A	5.87	1.03
Basin West*	1.76	0
Basin East*	0.92	0
Basin B	12.07	2.13
Basin C	0.50	0.09

*Assumes the entire basin is impervious to be conservative.

Analysis Results

Detention

The new underground detention facility is designed to capture the post developed flows from Basin A and Basin B and release the post developed flows at the release rates allowed in the Keizer Station Master Plan as shown in Table 1. A summary of allowed and proposed release rates, detention volumes and elevations are shown below in Table 4.

Table 4 – Proposed Underground Detention Facility Summary

Storm Event	Allowable Detention Release Rates (CFS)	Provided Detention Release Rates (CFS)	Water Surface Elevation/Volume (Ft/CF)*	Orifice Elevation/Size (Ft/Inches)
5 yr	4.48	4.46	153.92 / 29,682	149.11/8.7"
10 yr	6.05	6.03	154.64 / 35,379	153.84/7.5"
25 yr	8.00	7.98	155.58 / 41,893	154.54/6.3"
50 yr	9.82	9.82	156.85 / 47,859	155.41 /3"
100 yr	10.22	10.22	157.15 / 49,132	none

*The bottom of the underground detention is at elevation 149.8.

As shown in the above table and the attached model results in Appendix A the new underground detention facility has sufficient capacity to detain the build out flows of Basin A and B and meet the Keizer Station Master Plan release rates.

Water Quality

In accordance with the City's MSR Permit, we are required to treat the runoff from the 1.05-inch storm event. Due to the site compaction that was completed to the site prior, infiltration facilities

are not feasible. However, we are proposing to use Oldcastle Perfilters (Approved by Washington DOE) placed in two manholes to provide stormwater quality treatment for the proposed development.

Table 5 – Proposed Water Quality Treatment Facility Summary

Drainage Basin	Water Quality Flows (cfs)	Provided Water Quality Flows (cfs)
Basin West	0.38	0.42
Basin East	0.20	0.20

As shown in the Table 5, we are proposing to meet or exceed the required treatment flow rates.

If you have any questions or need additional information regarding our Stormwater Calculations, please contact us at
(503) 585-2474.

Sincerely,

WESTECH ENGINEERING, INC.

W. Josh Wells, P.E.

RENEWS: 6/30/2020

Keizer Station Area D Basin Map

Write a description for your map.

Legend

BASIN B
Area = 14.2 AC

BASIN A
Area = 6.90 AC

BASIN C
Area = 0.59 AC

Ridge Dr NE

St Croix Way NE

Stadium Dr

Ulali Dr

Salem Parkway Bike Path

99E

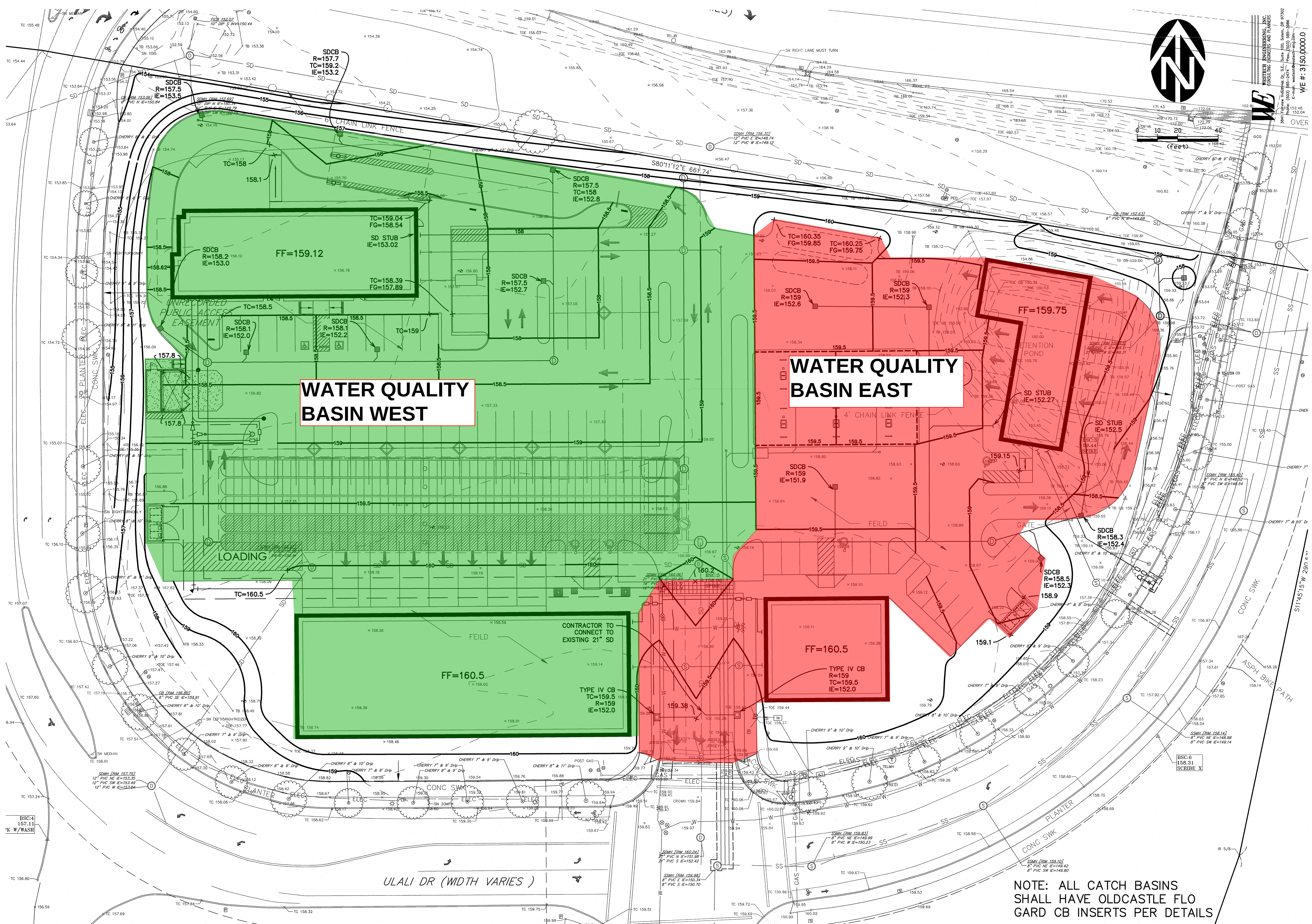
5

Chemawa Rd NE

N

500 ft

Google Earth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WATER QUALITY BASIN EAST
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FF=159.75
FF=160.5
FF=160.5
SDCB R=157.7 TC=159.2 IE=153.2
SDCB R=157.5 IE=153.5
SDCB R=157.5 TC=158 IE=152.8
SDCB R=158.2 IE=153.0
SDCB R=157.5 IE=152.7
SDCB R=158.1 IE=152.0
SDCB R=158.1 IE=152.2
SDCB R=159 IE=152.6
SDCB R=159 IE=152.3
SDCB R=159 IE=151.9
SDCB R=158.3 IE=152.4
SDCB R=158.5 IE=152.3
SD STUB IE=153.02
SD STUB IE=152.27
SD STUB IE=152.5
TC=159.04 FG=158.54
TC=158.39 FG=157.89
TC=160.35 FG=159.85
TC=160.25 FG=159.75
TYPE IV CB TC=159.5 R=159 IE=152.0
TYPE IV CB R=159 TC=159.5 IE=152.0
CONTRACTOR TO CONNECT TO EXISTING 21" SD
DETENTION POND
UNRECORDED PUBLIC ACCESS EASEMENT
LOADING
4' CHAIN LINK FENCE
6' CHAIN LINK FENCE
S80°11'12"E 661.74'
S11°45'15"W 290
ULALI DR (WIDTH VARIES)
ASPH BIKE PATH
WESTECH ENGINEERING, INC. CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com
WE #: 3150.0000.0
REGISTERED PROFESSIONAL ENGINEER 76413PE OREGON NOV. 12, 2008 WILLIAM J. WELLS
RENEWS: 6/30/2020
NOTE: ALL CATCH BASINS SHALL HAVE OLDCASTLE FLO GARD CB INSERTS PER DETAILS

Chemawa Station - Area 'D'

Ulali Drive | Keizer, Oregon

Chemawa Station LLC

PROJECT NO.

DRAWN BY :
AK

CHECKED BY :
JW

DATE :
6-12-19

REVISION :

overall grading plan

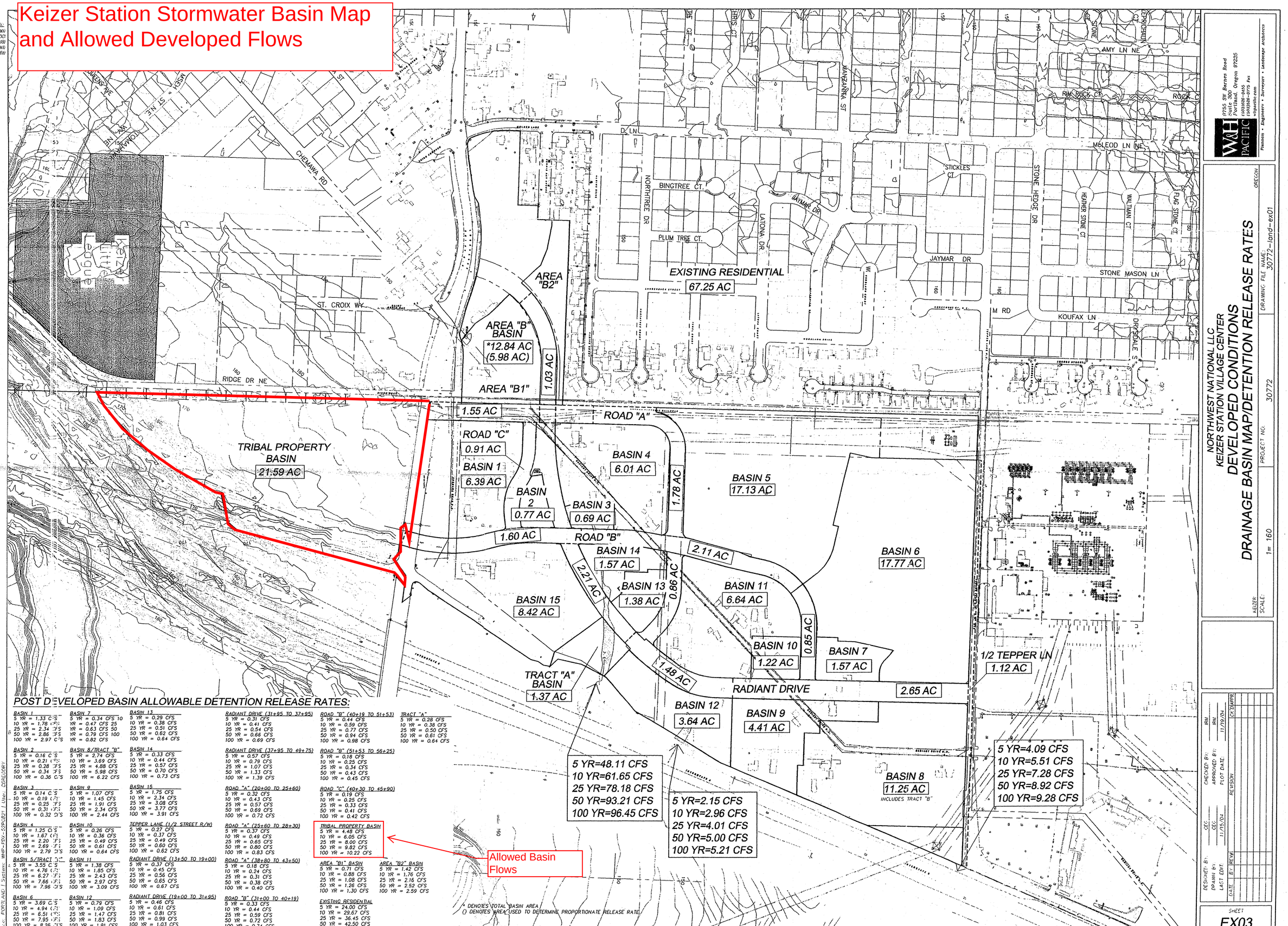
BSAA
ARCHITECTURE & PLANNING
BENNER STANGE ASSOCIATES ARCHITECTS, INC.
THE WATERMAN BUILDING
80 SE MADISON STREET
SUITE 430
PORTLAND, OR 97214
503-670-0234
FAX 503-670-0235
bsa@bsaarch.com

OVERALL GRADING PLAN

C4.0

r:\dwg\keizer station\area d-3150.0000.0\civil\plots\overall grading plan.dwg, plotted: 7/11/2019 11:06:41 AM

Keizer Station Stormwater Basin Map and Allowed Developed Flows



POST DEVELOPED BASIN ALLOWABLE DETENTION RELEASE RATES:

BASIN 1
5 YR = 1.33 CFS
10 YR = 1.78 CFS
25 YR = 2.34 CFS
50 YR = 2.86 CFS
100 YR = 2.97 CFS

BASIN 2
5 YR = 0.16 CFS
10 YR = 0.21 CFS
25 YR = 0.28 CFS
50 YR = 0.34 CFS
100 YR = 0.36 CFS

BASIN 3
5 YR = 0.14 CFS
10 YR = 0.19 CFS
25 YR = 0.25 CFS
50 YR = 0.31 CFS
100 YR = 0.32 CFS

BASIN 4
5 YR = 1.25 CFS
10 YR = 1.67 CFS
25 YR = 2.20 CFS
50 YR = 2.69 CFS
100 YR = 2.79 CFS

BASIN 5/TRACT "A"
5 YR = 3.55 CFS
10 YR = 4.76 CFS
25 YR = 6.27 CFS
50 YR = 7.66 CFS
100 YR = 7.96 CFS

BASIN 6
5 YR = 3.69 CFS
10 YR = 4.94 CFS
25 YR = 6.51 CFS
50 YR = 7.95 CFS
100 YR = 8.26 CFS

BASIN 7
5 YR = 0.34 CFS 10
YR = 0.47 CFS 25
YR = 0.63 CFS 50
YR = 0.79 CFS 100
YR = 0.82 CFS

BASIN 8/TRACT "B"
5 YR = 2.74 CFS
10 YR = 3.69 CFS
25 YR = 4.88 CFS
50 YR = 5.98 CFS
100 YR = 6.22 CFS

BASIN 9
5 YR = 1.07 CFS
10 YR = 1.45 CFS
25 YR = 1.91 CFS
50 YR = 2.34 CFS
100 YR = 2.44 CFS

BASIN 10
5 YR = 0.26 CFS
10 YR = 0.36 CFS
25 YR = 0.49 CFS
50 YR = 0.61 CFS
100 YR = 0.64 CFS

BASIN 11
5 YR = 1.38 CFS
10 YR = 1.85 CFS
25 YR = 2.43 CFS
50 YR = 2.97 CFS
100 YR = 3.09 CFS

BASIN 12
5 YR = 0.79 CFS
10 YR = 1.09 CFS
25 YR = 1.47 CFS
50 YR = 1.83 CFS
100 YR = 1.91 CFS

BASIN 13
5 YR = 0.29 CFS
10 YR = 0.38 CFS
25 YR = 0.51 CFS
50 YR = 0.62 CFS
100 YR = 0.64 CFS

BASIN 14
5 YR = 0.33 CFS
10 YR = 0.44 CFS
25 YR = 0.57 CFS
50 YR = 0.70 CFS
100 YR = 0.73 CFS

BASIN 15
5 YR = 1.75 CFS
10 YR = 2.34 CFS
25 YR = 3.08 CFS
50 YR = 3.77 CFS
100 YR = 3.91 CFS

TEPPER LANE (1/2 STREET R/W)
5 YR = 0.27 CFS
10 YR = 0.37 CFS
25 YR = 0.49 CFS
50 YR = 0.60 CFS
100 YR = 0.62 CFS

RADIANT DRIVE (13+50 TO 19+00)
5 YR = 0.37 CFS
10 YR = 0.45 CFS
25 YR = 0.56 CFS
50 YR = 0.65 CFS
100 YR = 0.67 CFS

RADIANT DRIVE (19+00 TO 31+95)
5 YR = 0.46 CFS
10 YR = 0.61 CFS
25 YR = 0.81 CFS
50 YR = 0.99 CFS
100 YR = 1.03 CFS

RADIANT DRIVE (31+95 TO 37+95)
5 YR = 0.31 CFS
10 YR = 0.41 CFS
25 YR = 0.54 CFS
50 YR = 0.66 CFS
100 YR = 0.69 CFS

RADIANT DRIVE (37+95 TO 49+75)
5 YR = 0.57 CFS
10 YR = 0.79 CFS
25 YR = 1.07 CFS
50 YR = 1.33 CFS
100 YR = 1.39 CFS

ROAD "A" (20+00 TO 25+60)
5 YR = 0.32 CFS
10 YR = 0.43 CFS
25 YR = 0.57 CFS
50 YR = 0.69 CFS
100 YR = 0.72 CFS

ROAD "A" (25+60 TO 28+30)
5 YR = 0.37 CFS
10 YR = 0.49 CFS
25 YR = 0.65 CFS
50 YR = 0.80 CFS
100 YR = 0.83 CFS

ROAD "A" (38+80 TO 43+50)
5 YR = 0.18 CFS
10 YR = 0.24 CFS
25 YR = 0.31 CFS
50 YR = 0.38 CFS
100 YR = 0.40 CFS

ROAD "B" (31+00 TO 40+19)
5 YR = 0.33 CFS
10 YR = 0.44 CFS
25 YR = 0.59 CFS
50 YR = 0.72 CFS
100 YR = 0.74 CFS

ROAD "B" (40+19 TO 51+53)
5 YR = 0.44 CFS
10 YR = 0.59 CFS
25 YR = 0.77 CFS
50 YR = 0.94 CFS
100 YR = 0.98 CFS

ROAD "B" (51+53 TO 56+25)
5 YR = 0.18 CFS
10 YR = 0.25 CFS
25 YR = 0.34 CFS
50 YR = 0.43 CFS
100 YR = 0.45 CFS

ROAD "C" (40+30 TO 45+90)
5 YR = 0.19 CFS
10 YR = 0.25 CFS
25 YR = 0.33 CFS
50 YR = 0.41 CFS
100 YR = 0.42 CFS

TRIBAL PROPERTY BASIN
5 YR = 4.48 CFS
10 YR = 6.05 CFS
25 YR = 8.00 CFS
50 YR = 9.82 CFS
100 YR = 10.22 CFS

AREA "B1" BASIN
5 YR = 0.71 CFS
10 YR = 0.88 CFS
25 YR = 1.08 CFS
50 YR = 1.26 CFS
100 YR = 1.30 CFS

AREA "B2" BASIN
5 YR = 1.42 CFS
10 YR = 1.76 CFS
25 YR = 2.16 CFS
50 YR = 2.52 CFS
100 YR = 2.59 CFS

EXISTING RESIDENTIAL
5 YR = 24.00 CFS
10 YR = 29.67 CFS
25 YR = 36.45 CFS
50 YR = 42.50 CFS
100 YR = 43.80 CFS

TRACT "A"
5 YR = 0.28 CFS
10 YR = 0.38 CFS
25 YR = 0.50 CFS
50 YR = 0.61 CFS
100 YR = 0.64 CFS

* DENOTES TOTAL BASIN AREA
() DENOTES AREA USED TO DETERMINE PROPORTIONATE RELEASE RATE

W&H PACIFIC
9755 SW Barnes Road
Suite 300
Portland, Oregon 97225
(503)626-0455
(503)626-0755 Fax
whpacific.com
Planners • Engineers • Surveyors • Landscape Architects

NORTHWEST NATIONAL LLC
KEIZER STATION VILLAGE CENTER

DEVELOPED CONDITIONS DRAINAGE BASIN MAP/DETENTION RELEASE RATES

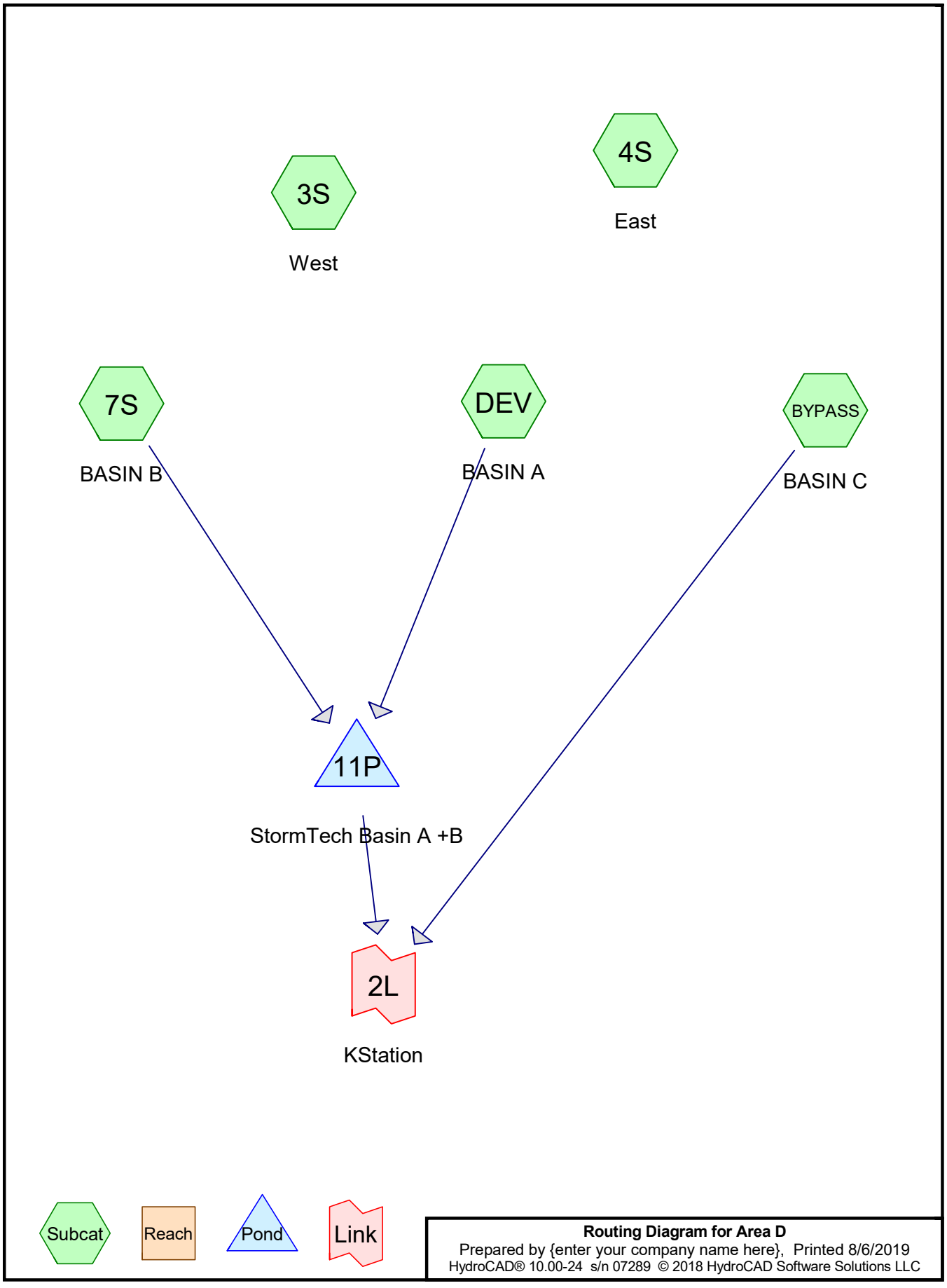
OREGON
KEIZER
SCALE: 1= 160
PROJECT NO. 30772
DRAWING FILE NAME: 30772-land-ex01

DESIGNED BY:	DEC	CHECKED BY:	RM
DRAWN BY:	DEC	APPROVED BY:	RM
LAST EDIT	11/15/04	PLOT DATE:	11/19/04

DATE	BY	REVISION	CK'D/APPR

SHEET
EX03

DWG. INDEX:
30772-SIT-BND
OUT
30772-MST-BND
OUTBND
30772-XRT-BND


4S
East
3S
West
7S
BASIN B
DEV
BASIN A
BYPASS
BASIN C
11P
StormTech Basin A +B
2L
KStation
Subcat
Reach
Pond
Link
Routing Diagram for Area D
Prepared by {enter your company name here}, Printed 8/6/2019
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