PROJECT MANUAL

PROJECT NAME AND LOCATION:

SITE DEVELOPMENT – ADD 13 HOME SITES **Contract Number: DW2402331**
RAINIER MOBILE HOME PARK

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INVITATION TO BID

King County Housing Authority (KCHA) will accept bids from qualified general contractors to furnish labor, materials and necessary equipment to perform the following:

SCOPE OF WORK: Work includes, but are not limited to, adding 13 new mobile home sites and related infrastructure improvements, and other work described in project documentation.

PROJECT MANUAL DISTRIBUTION:

Address:		King County Housing Authority, 600 Andover Park, Seattle, WA 98188
Distribution:	*	**Documents are available for download on KCHA's website at http://www.kcha.org/business/construction/open/**

PRE-BID CONFERENCE:

Date and Time:	August 6, 2024 at 10:00 A.M.
Jobsite Address:	Rainier View Manufactured Home Park, 32631 1st Ave, Black Diamond, WA 98010.
In Addition:	Contractors are strongly encouraged to attend the Pre-Bid Conference. Failure to attend the Conference will not relieve the Contractor of any responsibility for information provided at that time.
For Questions:	Questions pertaining to the bid are to be sent via email to MichelleJ@kcha.org no later than seven (7) calendar days prior to bid due date. All responses shall be in the form of Addenda.
Posting:	Addenda notifications will be emailed to all members of the Plan Holders List and will be posted on KCHA's website.

BIDS ARE DUE:

Time:		**2:00 P.M.**
Date:		**August 29, 2024**
Address:		King County Housing Authority 600 Andover Park West, Seattle, WA 98188
Submittal Process:	*	Sealed Envelope marked as **"Bid Documents: Rainier View Site Development"** (Mailing / Shipping Package or Wrapping must also be marked with this information).
Process:		All Bids must be received, and time and date stamped, at KCHA no later than the above due date and time. No Bids will be accepted after that date and time. **No Fax or Email Bids will be accepted.**

BID GUARANTEE:

Amount:	Five (5%) Percent of the Total bid must accompany Each Bid
Payable to:	King County Housing Authority

PERFORMANCE AND PAYMENT BONDS & RIGHT OF WAY BOND: As a condition of award payment and performance bonds for 100% of the Contract Award Amount shall be furnished for the Work. Right of Way Bond according to the requirements of the City of Black Diamond.

KCHA is an Equal Employment Opportunity Employer and strongly encourages minority-owned and women-owned businesses, socially and economically disadvantaged businesses, and small businesses to submit bids or to participate as subcontractors and suppliers on KCHA Contracts.

KCHA reserves the right to reject any or all bids or to waive any informality in the bidding. No bid shall be withdrawn for a period of 60 calendar days subsequent to the opening of the bids without the written consent of KCHA.

CONTACT PERSON: Michelle Jackson at MichelleJ@kcha.org

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Site Development

B. Work consists of adding 13 new mobile home sites and related infrastructure improvements.

C. Project Location

1. Rainier View Mobile Home Park, 32631 1st Ave., Black Diamond, WA 98010

D. Work includes:

1. Add 13 new mobile home sites to the existing park.

2. Excavation, trenching, import/export, compaction, rough and finish grading, TESC measures.

3. Asphalt paving, concrete curbs, gutters, sidewalks.

4. Utilities including drainage systems, sewer systems, electrical services, water services, communication services.

5. Landscaping, tree removals, ROW permits.

6. Mailbox structure and 13 utility pedestals including electrical and water meters.

7. Coordination with municipal permits and inspections.

8. Coordination with PSE and cable provider for electrical and communication services.

9. Coordination with City of Black Diamond for water and sewer services.

10. Cleanup, disposal and site management measures as needed to provide safe and secure access for existing tenants who will remain on site.

11. All measures as required by all contract documents, plans, specifications and permits.

12. Standard Specifications:
    a. The STANDARD SPECIFICATIONS shall be the latest edition of “Standard specifications for Road, Bridge and Municipal Construction” prepared by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association.

b. References in the Standard Specifications to "agency" or "department" or other governmental entity of ownership shall refer to the OWNER.
c. References in the Standard Specifications to "engineer" or "project engineer" shall refer to the OWNER's Project Manager or its representative.

1.2 WORK SEQUENCE

A. The Work shall be completed in 180 calendar days from the date of Notice to Proceed.

1.3 LIQUIDATED DAMAGES

A. Liquidated damages will be assessed for each calendar day that the Contractor exceeds the time for completion in the amount of $250.

1.4 WORK RESTRICTIONS

A. Use of the Premises

1. Use of Site: Limit use of premises to work areas. Do not disturb portions of site beyond areas in which the Work is indicated.

a. Owner Occupancy: Allow for resident occupancy of site. Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate resident usage.
b. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to residents and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

2. Use of Existing Buildings: Maintain existing buildings in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect property, the buildings and occupants during construction period.

B. Occupancy Requirements

1. Full Owner Occupancy: Owner and tenants will occupy site and existing buildings during the entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner and tenant usage. Perform the Work so as not to interfere with Owner's operations.

1.5 PAYMENT PROCEDURES

A. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

B. Each Application for Payment shall be consistent with previous applications and payments.

C. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

D. Waivers of Lien: With each Application for Payment, submit conditional waivers lien from every entity that is lawfully entitled to file a lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

E. Final Payment Application: Submit final Application for Payment with releases and close out supporting documentation.

1.6 PROJECT MEETINGS

A. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, but no later than seven days after execution of the Agreement.

1.7 SUBMITTALS

A. Provide product data for each element of construction and type of product or equipment for approval by Owner.

B. Subcontract list. Prepare written information that demonstrates capabilities and experience of firm or persons.

C. Contractor’s project manager and/or supervisors. Prepare written information that demonstrates capabilities and experience of firm or persons.

1. The Owner will review subcontractors and assigned staff and will accept or reject based on experience or qualifications.

D. The Contractor shall submit a site-specific safety plan to the Owner’s representative prior to the initial scheduled construction meeting.

1.8 TEMPORARY FACILITIES

A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against.

C. Use of Owner's existing electric power and water service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

D. Owner and contractor will negotiate and establish adequate parking and lay-down areas as required to perform the work. Additional storage container placement and temporary office trailer will be allowed after approvals by owner on locations.

1.9 EXECUTION REQUIREMENTS

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1.10 CUTTING AND PATCHING

A. Quality Assurance

1. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
2. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Owner's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Performance

1. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
2. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

    a. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    b. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

1.11 SELECTIVE DEMOLITION

A. Hazardous Materials
   1. It is not expected that hazardous materials will be encountered in the Work.
   2. If other materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Owner.

1.12 CLOSEOUT PROCEDURES

A. General: Provide daily and final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. All waste materials are to be removed and disposed of off-site.

   1. Prior to acceptance of the work at any location, clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

B. At final completion and prior to final payment submit written warranties indicated in other sections.

END OF SECTION 01100

Appendix A
Soils & Geotechnical Reports

Geotechnical Engineering Services

King County Housing Authority
Rainer View Mobile Home Park
Black Diamond, Washington

for
The Kirkbride Group, Inc.

October 26, 2023

GeoEngineers
Earth Science + Technology

Geotechnical Engineering Services

King County Housing Authority
Rainer View Mobile Home Park
Black Diamond, Washington

for
The Kirkbride Group, Inc.

October 26, 2023

GeoEngineers

1101 Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Geotechnical Engineering Services

King County Housing Authority
Rainier View Mobile Home Park
Black Diamond, Washington

File No. 1329-019-01

October 26, 2023

Prepared for:

The Kirkbride Group, Inc.
4405 7th Avenue SE, Suite 301
Lacey, Washington 98503

Attention: Frank Kirkbride

Prepared by:

GeoEngineers, Inc.
1101 Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

10/26/23

Dennis (D.J.) Thompson, PE
Associate

LSP:DJT:leh

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APPENDICES

1.0 INTRODUCTION AND SCOPE OF SERVICES

This report presents the results of our geotechnical investigation and studies performed for King County Housing Authority (KCHA) Rainer View Mobile Home expansion project to be located at 32631 1st Avenue in Black Diamond, Washington (Parcel No. 0841000005). The location of the site and vicinity are shown in the Vicinity Map, Figure 1. The general configuration of the proposed expansion project within the KCHA site is shown in the Site Plan, Figure 2.

Our understanding of this project is based on our discussions with you and members of the project team, including Bill Turner of Turner Consulting Engineers (Civil Engineer) and review of the project Master Plan dated March 8, 2022 (master plan). In addition, we have completed past studies on this project including preparation of a report; "Geologic and Coal Mine Hazard Services Report" dated January 20, 2020 (geologic hazard report) and preparation of a letter; "Infiltration Feasibility Assessment" dated January 29, 2020 (infiltration assessment letter). In this letter, we provided a paper study and our opinion of site soils infiltration potential based on the 2014 Stormwater Management Manual for Western Washington (SMMWW). We have also completed nearby geotechnical studies in 2015 for the Black Diamond Elementary School located at 25314 Baker Street.

The master plan shows the addition of 15 mobile home sites to be constructed within the Rainer View property in areas designated as 1, 2, and 4. The number of homes could change slightly, but not expected to be of significance for the purposes of this report. Most of the site is already in use with mobile homes, roadways, driveways, and established yards. The new sites (15) will be constructed amongst the existing homes and be found at or near surrounding roadway grade. It is expected that the homes will be supported on shallow foundations and/or a pier block type system with a strip footing below; deep foundations are not planned. Most of the sites will require a net export of soil to establish foundation grade.

Stormwater management for the new improvements is designed to be released into the existing city stormwater system with flow control. This is the current design being used for the existing facilities (roads, roofs, sidewalks, etc.) within the project site. The 2019 SMMWW developed by the Washington State Department of Ecology has been designated as the governing stormwater design guideline for this project.

Our services have been provided in general accordance with our proposal signed on September 20, 2023. The scope of our services consists of completing subsurface explorations, obtaining soil samples to verify/modify our infiltration assessments, and to provide general geotechnical criteria as it relates to the proposed design and construction (single family mobile home dwellings). Our specific scope of services can be reviewed in our proposal and can be provided upon request.

2.0 SITE CONDITIONS

2.1. Surface Conditions

We have provided detailed information on site surface conditions in our geologic hazards report and infiltration assessment letter. Based on recent efforts, we conclude that surface conditions as described do not appear different than previously presented.

2.2. Geology Review

We have reviewed our geologic hazards report and infiltration assessment letter while preparing this study. We recommend these reports be reviewed for detailed information on published literature previously reviewed and our assessment and interpretation of subsurface geology. In general, we conclude that our assessments remain unchanged as a result of this study.

2.3. Natural Resources Conservation Service (NRCS) Description

We reviewed the Natural Resources Conservation Service (NRCS) Web Soil Survey (accessed October 21, 2023) which typically describes soil conditions the site is underlain by Beausite Gravelly Sandy loam (BeC), 6 to 15 percent slopes. The literature indicates the parent material to be till over residuum from sandstone. The material is described as well drained with the most limiting layer to transmit water to be moderately high to high. The literature further indicates that soil profile at the immediate surface is a gravelly ashy sandy loam or a very gravelly sandy loam to depths of 38 to 42 inches. Below this depth, the profile lists bedrock as the typical soil type. The literature also describes the depth to water table to be greater than 80 inches.

2.4. Subsurface Conditions

2.4.1. Subsurface Explorations

We explored subsurface conditions at the site by advancing six test pits (TP-1 Through TP-6) on October 11, 2023, at the approximate locations shown in Site Plan, Figure 2. The test pits were advanced to depths of approximately 3½ and 8½ feet below ground surface (bgs). Details regarding our subsurface exploration program are provided in Appendix A. A key to the explorations logs is presented as Figure A-1 and summary logs are presented as Figure A-2 through Figure A-8. TP-4 and TP-4a are shown only as TP-4 in Figure 2. During excavation of TP-4, we observed what appeared to be abandoned steel utility/pipe, subsequently, TP-4a was excavated nearby and subsurface conditions recorded.

2.4.2. Soil Conditions

2.4.2.1. General

We observed what we interpreted to be two general geologic units in our explorations, fill and what we have described in our past studies as Puget Group Sandstone deposits. We did not easily recognize what we would consider glacial till and/or glacial drift deposits that have been reported to be near the area. Explorations were advanced through a layer of grass surfacing underlain by 6 inches of additional sod or silty sand with organic materials and roots. Brief descriptions of each soil unit observed below this 6-inch layer are provided below.

2.4.2.2. Fill

We interpret fill soils, below the 6 inch sod/silty sand layer, to be present at all of the explorations. Fill material was generally described as a silty sand with varying amounts of gravel and some organic matter. The fill, on average, is described as medium dense. The thickness varies between 2½ feet and 7½ feet in the explorations, with greater fill depths reported toward the north portion of the development. We interpret the fill to comprise reworked natural soils, likely placed during initial site development. Based on our explorations and surface conditions, some of the local hummocky terrain near areas 1 and 2 would be indicative of fill placed and stockpiled as a result of past grading.

2.4.2.3. Puget Group Sandstone

The Puget Group Sandstone is described as interbeds of siltstone, shale, claystone, carbonaceous claystone or siltstone and coal beds. We generally describe these materials as silty sand with moderate oxidation staining, and also containing gravel, cobbles, and boulders. Clay seams were noted in some of the explorations. Material generated in blocks of soil containing gravel and cobbles were noted in TP-5 at depth, which we have found common occurrences when excavating in weathered rock sites. We generally interpret the natural soils observed to be the weathered Puget Group Sandstone materials mapped in the project area. Due to the increased density of weathered materials, we were unable to penetrate to an underlying, more in-tact, siltstone. Practical refusal was generally noted in most of the explorations at the depths explored.

2.4.3. Groundwater Conditions

We did not observe groundwater or the presence of seepage in any of our explorations. Groundwater was not reported to depths of at least 18 feet within nearby explorations. Many coal mine hazard areas are present nearby. Review of our summary of these areas indicate mine workings between 80 and 300 feet below the project site. Groundwater was not reported to have been an issue when reviewing these studies. Overall, we expect that static groundwater in the region will be much deeper than excavations required for this project.

We did note occasional soil coloring and iron-oxide staining in many of the explorations, which is an indication of presence of groundwater seepage at various times of the year. We interpret slow to moderate groundwater seepage as well as intermittent shallow seepage could be encountered in some excavations, depending on time of year. It is common for perched groundwater to be present near contacts where soil that is more permeable overlies soil that is less permeable, for example, fill or weathered soil over denser fine-grained silts, weathered and in-tact rock, clay, or even glacial till. The presence of perched groundwater at the site is expected to occur from infiltration of surface water during rain events and is expected to be discontinuous and intermittent. The amount of perched groundwater encountered will vary depending on a variety of conditions including topography, season, irrigation activities, installation of hardscaping, and rainfall events. We anticipate the likelihood for encountering perched groundwater will be lowest during the dryer months of the year, typically between June and September in this region.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1. General

Based on our understanding of the project, the explorations performed for this study and our experience, it is our opinion that the proposed improvements can be constructed generally as envisioned regarding geotechnical considerations. Our recommendations provided are suitable, in our opinion, for general planning and design for near grade single story structures, temporary or permanent, with shallow foundations, or similar.

We strongly recommend that our geologic hazards report also be reviewed and included as a part of final planning and design of Area 4. We have noted the potential presence of mine shafts and/or coal workings below portions Area 4.

A summary of the primary geotechnical considerations for the project is provided below and is followed by our detailed recommendations.

- We anticipate that shallow foundation construction, or similar design, will be adequate for conventional building support for this project. Foundation elements may be established in the existing fill or on native soils. We recommend that a minimum 18-inch-thick base of crushed rock be provided below footings to establish a uniform bearing surface and for protection. This will require overexcavation and import.
- We anticipate perched groundwater may be encountered during site excavations and grading depending on time of year. Intermittent perched groundwater should be able to be adequately managed through the use of sumps, pumps and other shallow groundwater handling techniques typically used in construction.
- The site soils encountered in our explorations contain a significant percentage of fines (material passing the U.S. No. 200 sieve). Soil with a higher fines content, present at this site, is more sensitive to small changes in moisture content and may be difficult, if not impossible, to work and compact during wet weather conditions. This material can also be susceptible to disturbance when wet or if earthwork is performed during wet weather. We do not recommend re-use of on-site soil, except for landscaping purposes, where applicable.
- Due to the composition of on-site soils and based on our sieve analysis in conjunction with the infiltration rate determination procedures outlined in the 2019 SMMWW, we would consider that infiltration into on-site subsurface materials to be, in all practicality, infeasible.

3.2. Seismic Design Considerations

3.2.1. Seismic Design Parameters

In accordance with requirements in the 2018 International Building Code (IBC), we performed a preliminary evaluation of seismic design parameters per American Society of Civil Engineers (ASCE) 7-16. Based on our explorations completed for this study and our experience in areas with similar soil conditions, it is our opinion that the site can be characterized as Site Class D.

Further, per ASCE 7-16 Section 11.4.8, a ground motion hazard analysis is required for structures on Site Class D with S_1 greater than or equal to 0.2. As shown in Table 1 below, S_1 is greater than 0.2 for this site; therefore, this provision applies. Alternatively, per ASCE 7-16 Supplement 3 Section 11.4.8, a ground motion hazard analysis is not required where the value of S_{M1} is increased by 50 percent for all applications of S_{M1} and the resulting value of S_{D1} is used for all applications of S_{D1}. This exception was applied and incorporated in the recommended seismic design parameters provided in Table 1 below. While we do not expect it to be necessary for this project, we can conduct ground motion hazard analysis and provide a site-specific response spectrum, if desired by the design team.

TABLE 1. SEISMIC DESIGN CRITERIA

ASCE 7-16 Parameters[1]	Value
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Period, S_s (g)	1.168
Mapped MCE_R Spectral Response Acceleration at 1-second period, S_1 (g)	0.401
Site Modified Peak Ground Acceleration, PGA_M	0.547

ASCE 7-16 Parameters[1]	Value
Short Period Site Coefficient, F_a	1.033
Long Period Site Coefficient, F_v	1.899
Design Spectral Acceleration at 0.2-second period, S_{DS} (g)	0.804
Design Spectral Acceleration at 1.0-second period, S_{D1} (g)	0.761[2]
Site Modified Earthquake Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.206
Site Modified Considered Earthquake Spectral Response Acceleration at 1-Second Periods, S_{M1} (g)	1.142[2]

Notes:

[1] Parameters developed based on latitude 47.308262 and longitude -122.005855 using the Applied Technology Council (ATC) Hazards online tool (https://hazards.atcouncil.org/).

[2] Per ASCE 7-16 Supplement 3 Section 11.4.8 Item 1, parameter has been increased 50 percent or has increased by 50 percent as a result of the adjusted S_{M1} value.

3.3. Liquefaction, Lateral Spreading, and Surface Rupture

3.3.1. Liquefaction

Liquefaction refers to a condition where vibration or shaking of the ground, usually from earthquake forces, results in development of excess pore pressures in loose, saturated soils and subsequent loss of strength in the deposit of soil so affected. In general, soils that are susceptible to liquefaction include loose to medium dense sands to silty sands that are below the water table.

We reviewed readily available liquefaction susceptibility maps, including the *Liquefaction Susceptibility Map of King County, Washington* (Palmer et al. 2004). According to the reviewed maps, the potential for liquefaction at this site is very low. Based on the soil types and relative densities observed in our explorations and our interpretation of the regional geology and groundwater table, it is also our opinion the potential for liquefaction at this site is very low.

3.3.2. Lateral Spreading Potential

Lateral spreading related to seismic activity typically involves lateral displacement of large, surficial blocks of non-liquefied soil when a layer of underlying soil loses strength during seismic shaking. Lateral spreading usually develops in areas where sloping ground or large grade changes (including retaining walls) are present. Based on our understanding of the proposed improvements and site grading, subsurface conditions, liquefaction risk and current site topography, it is our opinion that the risk of lateral spreading is low.

3.3.3. Surface Rupture Potential

We reviewed geologic reports for the Black Diamond quadrangle (Mullineaux 1970). Surface fault rupture is considered a potential in the Black Diamond area, as the undifferentiated Puget Group sandstone bedrock is broken by many small high angle normal and reverse faults. We describe and present more details on faults in the area within our geologic hazards report. One major fault, the Franklin fault (fault zone) is a strike-slip fault reported to be approximately 2,000 feet south of the site. Another unnamed fault is reported north of our site. Based on the proximity of the site to these mapped faults, lack of detail on fault zones near the site, and the unlikely event that fault ruptures will manifest at the ground surface, it is our opinion the risk to this project because of surface rupture is low.

3.4. Site Development and Earthwork

3.4.1. General

We anticipate site development and earthwork will include clearing and stripping vegetated areas, demolition of existing hardscaping, site grading, establishing subgrades for driveways, parking areas, building foundations, and placing and compacting fill and backfill materials. We expect that the majority of site grading and earthwork can be accomplished with conventional earthmoving equipment. The following sections provide recommendations for stripping, erosion and sedimentation control, excavation, temporary and permanent cut slopes, wet weather considerations, fill materials and fill placement and compaction requirements.

3.4.2. Clearing and Stripping

Based on conditions observed in our explorations, minimum stripping depths at the site will likely be on the order of 6 inches. Greater stripping depths could be required to remove localized zones of loose or organic-rich soil, especially in areas of the site with heavier vegetation. During clearing and stripping, stumps and primary root systems of shrubs and trees should be completely removed. Voids caused by removal of stumps and/or root systems should be backfilled with compacted structural fill. Stripped material should be transported off site or processed and used as fill in landscaping areas.

Based on our explorations, we anticipate that soils exposed will have a high fines content and thus be susceptible to disturbance when wet. Care should be taken to avoid allowing these soils to become saturated and disturbed. We provide recommendations for subgrade protection the “Subgrade Protection and Wet Weather Considerations” of this report.

Cobbles were occasionally encountered in our explorations. Subsurface conditions described in the published site geology would indicate a strong likelihood of encountering cobbles and boulders during excavations at this site. Boulders may be removed from the site or used in landscape areas. Voids caused by boulder removal should be backfilled with structural fill.

Structural elements of existing pavements and/or structures should be demolished and removed from within the footprint of the proposed improvements. During demolition, excessive disturbance of surficial soils may occur, especially if left exposed to wet conditions. Disturbed soils may require additional remediation during construction and grading.

3.4.3. Erosion and Sedimentation Control

Erosion and sedimentation rates and quantities can be influenced by construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. Implementing an erosion and sedimentation control plan will reduce the project impact on erosion-prone areas. The plan should be designed in accordance with applicable city, county and/or state standards. The plan should incorporate basic planning principles, including:

- Scheduling grading and construction to reduce soil exposure.
- Re-vegetating or mulching denuded areas.
- Directing runoff away from exposed soils.
- Reducing the length and steepness of slopes with exposed soils.

- Decreasing runoff velocities.
- Preparing drainage ways and outlets to handle concentrated or increased runoff.
- Confining sediment to the project site.
- Inspecting and maintaining control measures frequently.

Some sloughing and raveling of exposed or disturbed soil on slopes should be expected. We recommend that disturbed soil be restored promptly so that surface runoff does not become channeled.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce erosion and reduce transport of sediment to adjacent areas and receiving waters. Permanent erosion protection should be provided by paving, structure construction or landscape planting.

Until permanent erosion protection is established and the site is stabilized, site monitoring may be required by qualified personnel to evaluate the effectiveness of the erosion control measures and to repair and/or modify them as appropriate. Provision for modifications to the erosion control system based on monitoring observations should be included in the Erosion and Sedimentation Control Plan.

3.4.4. Temporary Excavations and Cut Slopes

Excavations deeper than 4 feet should be shored or laid back at a stable slope if workers are required to enter. Shoring and temporary slope inclinations must conform to the provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring." Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required under Washington Industrial Safety and Health Act (WISHA). The contract documents should specify that the contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety and providing shoring, as required, to protect personnel and structures.

In general, temporary cut slopes should be inclined no steeper than about 1.5H:1V (horizontal to vertical). Steeper slopes, on the order of 1H:1V may be attainable in the dense, undisturbed silts and clays and should be considered on a case-by-case basis with our review. These guidelines assume all surface loads are kept a minimum distance of at least one-half the depth of the cut away from the top of the slope and seepage is not present on the slope face. Flatter cut slopes will be necessary where seepage occurs or if surcharge loads are anticipated. Temporary covering with heavy plastic sheeting should be used to protect these slopes during periods of wet weather.

3.4.5. Permanent Cut and Fill Slopes

We recommend permanent slopes be constructed at a maximum inclination of 2H:1V. Where 2H:1V permanent slopes are not feasible, protective facings and/or retaining structures should be considered. This guideline assumes all surface loads are kept at a minimum distance of at least one-half the height of the slope away from the top of the slope and seepage is not present on the slope face. Flatter cut slopes or additional drainage measures could be necessary where seepage occurs or if surface surcharge loads are anticipated.

To achieve uniform compaction, we recommend that fill slopes be overbuilt and subsequently cut back to expose well-compacted fill. Fill placement on slopes steeper than 5H:1V should be benched into the slope face. The configuration of benches depends on the equipment being used and inclination of the existing

slope. Bench excavations should be level and extend into the slope face at least half the width of the compaction equipment used.

Exposed areas should be re-vegetated as soon as practical to reduce the surface erosion and sloughing. Temporary protection should be used until permanent protection is established.

3.4.6. Temporary Groundwater Handling Considerations

Groundwater handling needs will typically be lower during the late summer and early fall months. Based on our explorations and review of available data in the project area, we do not expect static groundwater to be a significant factor during shallow excavations and earthwork activities. We anticipate shallow perched groundwater can typically be handled adequately with sumps, pumps and/or diversion ditches, as necessary. Perched groundwater at relatively shallow depths is typically surface water that has recently infiltrated or seeped from nearby. Proactive handling of surface water (e.g., grading to reduce ponding) can reduce groundwater handling needs. Ultimately, we recommend the contractor performing the work be made responsible for controlling and collecting groundwater encountered.

3.4.7. Surface Drainage

Surface water should be collected and controlled. Curbs or other appropriate measures such as sloping pavements, sidewalks and landscape areas should be used to direct surface flow away from subgrades, excavations, erosion sensitive areas and from behind retaining structures. Roof and catchment drains should not be connected to wall or foundation drains.

3.4.8. Subgrade Preparation and Evaluation

Subgrades that will support structural fill, structures and/or paving should be thoroughly compacted to a uniformly firm and unyielding condition on completion of stripping and demolition, prior to placing fill or structures. We recommend subgrades be evaluated to identify areas of yielding or soft soil. Evaluation methods such as probing with a steel probe rod or proof-rolling with a heavy piece of wheeled construction equipment are appropriate methods of evaluation.

If soft or otherwise unsuitable subgrade areas are revealed during evaluation that cannot be compacted to a stable and uniformly firm condition, we recommend: (1) the unsuitable soils be scarified (e.g., with a ripper or farmer's disc), aerated and recompacted, if practical; or (2) the unsuitable soils be removed and replaced with compacted structural fill, as needed.

Specific recommendations for bearing surface and pavement subgrade preparation are also provided in this report.

3.4.9. Subgrade Protection and Wet Weather Considerations

The soils encountered in our explorations contain a significant amount of fines and will be susceptible to disturbance during periods of wet weather. Soil with high fines content is very sensitive to small changes in moisture and is susceptible to disturbance from construction traffic when wet or if earthwork is performed during wet weather. If wet weather earthwork is unavoidable, we recommend that the following steps be taken.

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded so that areas of ponded water do not develop. Measures should be taken by the contractor to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Earthwork activities should not take place during periods of heavy precipitation.
- Slopes with exposed soils should be covered with plastic sheeting.
- The contractor should take necessary measures to prevent on-site soils and other soils to be used as fill from becoming wet or unstable. These measures may include the use of plastic sheeting, sumps with pumps and grading. The site soils should not be left uncompacted and exposed to moisture. Sealing the exposed soils by rolling with a smooth-drum roller or other appropriate compaction equipment prior to periods of precipitation will help reduce the extent to which these soils become wet or unstable.
- Construction traffic should be restricted to specific areas of the site, preferably areas that are surfaced with working pad materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practical.
- For this project, we expect a fill material using crushed rock and/or gravel will be most practical. Typically, minimum gravel thicknesses on the order of 12 to 18 inches are necessary to provide adequate subgrade protection for repeated construction traffic. Maintaining the existing asphalt surfacing is also an adequate method of protection; however, asphalt could become distressed and may need repairs depending on the amount of heavy truck traffic. Other options, such as fabrics, asphalt- treated base (ATB), and/or cement treatment can also provide protection, and evaluated on a case-by-case basis.
- Foundation bearing surface protection should also be considered. We provide additional recommendations in the “Shallow Foundations” of this report.

3.5. Fill Materials

3.5.1. Imported Fill Materials

Material used for structural fill should be free of rock fragments larger than 6 inches in maximum dimension, debris, and organics. As the percentage of fines increases, fill materials become increasingly sensitive to changes in moisture. Typically, soil containing more than about 5 percent fines becomes more sensitive to changes in moisture and will become difficult to compact when just a few percent above the optimum moisture content. We recommend project engineers review contractor submittals for earthwork materials prior to use on site.

For this project, we recommend imported soil comprise select granular fill consisting of well-graded sand and gravel or crushed rock with a maximum particle size of 6 inches and less than 5 percent fines by weight based on the minus ¾-inch fraction. Organic matter, debris or other deleterious material should not be present. In our opinion, material with gradation characteristics similar to 2020 Washington State Department of Transportation (WSDOT) Specification 9-03.9 “Aggregates for Ballast and Crushed

Surfacing", or "Gravel Backfill for Walls" approximately the same quality as WSDOT Standard Specification 9-03.12(2).

If prolonged periods of dry weather will prevail during the earthwork phase of the project, materials with a somewhat higher fines content, such as "Select Borrow" or "Gravel Borrow" as described in Section 9-03.14 of the 2020 WSDOT Standard Specifications may be acceptable, as approved by the project engineer.

3.5.2. Quarry Spalls

Where needed, we recommend that quarry spalls consist of 2- to 4-inch washed, crushed stone similar to that described in Section 9-13 of the 2020 WSDOT Standard Specifications. Alternative stone size ranges may be considered, depending on the application.

3.5.3. Recycled Materials

In our opinion, recycled material (such as existing asphalt and concrete) may be considered as fill material on site provided the material is in accordance with 2020 WSDOT Standard Specification 9-03.21 "Recycled Material" and meets requirements for its end use. Ultimately the use of recycled materials should be reviewed and considered by the project engineers. Weather, placement, and location will also be a factor in determining the usefulness of the materials. Recycled asphalt should not be considered for use within building areas or below foundations. The use of recycled asphalt and/or concrete may also need approval for use from the City or other jurisdictional authority.

3.5.4. On-Site Soil

Based on our experience, the silty soils encountered in our explorations are moisture sensitive and will be very difficult or impossible to properly compact when wet. In addition, we expect that existing soils will be excavated at moisture contents above optimum moisture content to achieve adequate compaction. In general, we do not recommend on-site materials be considered for use as a structural fill. Existing site soil could be reserved for use as fill in non-structural areas, as approved by the project engineer.

3.5.5. Topsoil Strippings

Topsoil stripping's may be placed on site provided they are placed in non-structural areas that can tolerate significant long-term total and differential settlements. Settlements of organic-rich soils are highly variable and difficult to quantify. Settlement could continue for several years after construction is completed as the organics break down and decompose. Alternatively, topsoil strippings can be hauled off site.

3.6. Fill Placement and Compaction

3.6.1. General

To obtain proper compaction, fill material should be compacted near optimum moisture content and in uniform horizontal lifts. Lift thickness and compaction procedures will depend on the moisture content and gradation characteristics of the soil and the type of equipment used. The maximum allowable moisture content varies with the soil gradation and should be evaluated during construction. Compaction should be achieved by mechanical means. In general, 12-inch-thick loose lifts are appropriate for steel-drum vibratory roller compaction equipment. During fill and backfill placement, regular testing of in-place density should be conducted to verify adequate compaction is being achieved.

3.6.2. Area Fills and Pavement Bases

Fill placed to raise site grades and materials under pavements and structural areas should be placed on subgrades prepared as previously recommended. Fill material placed below structures and footings must be compacted to at least 95 percent of the theoretical maximum dry density (MDD) per ASTM International (ASTM) D 1557. Fill material placed less than 2 feet below pavement sections must be compacted to at least 95 percent of the MDD. Fill placed deeper than 2 feet below pavement sections must be compacted to at least 90 percent of the MDD. Fill material placed in landscaping areas should be compacted to a firm condition that will support construction equipment, as necessary, typically around 85 to 90 percent of the MDD.

3.6.3. Trench Backfill

For utility excavations, we recommend the initial lift of fill over the pipe be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches. In addition, rock fragments greater than about 1 inch in maximum dimension should be excluded from this lift.

Trench backfill material placed below structures and footings must be compacted to at least 95 percent of the MDD. In paved areas, trench backfill must be compacted to at least 95 percent of the MDD in the upper 2 feet below subgrade. Fill placed below a depth of 2 feet from subgrade in paved areas must be compacted to at least 90 percent of the MDD. In non-structural areas, trench backfill should be compacted to a firm condition that will support construction equipment as necessary.

3.6.4. Fill in Non-Structural Areas

Areas that will not support buildings or pavements and can tolerate moderate total and differential settlements will not require structural fill. To limit long-term settlements that could affect site drainage, we recommend fill placed in these non-structural areas be compacted to at least 85 to 90 percent of the MDD and generally contain no more than 10 percent organic material by weight.

3.7. Shallow Foundations

3.7.1. Bearing Surface Preparation

Proposed structures can be founded and established on continuous wall, strip, and isolated column footings. To provide uniform bearing support and protection of bearing surfaces and subgrades, we recommend overexcavation below foundations of a minimum of 16- to 18-inches and replacement with a select granular fill or crushed rock. We recommend that foundations not bear directly on existing materials without improvements.

Prepared foundation bearing surfaces should be evaluated by the geotechnical engineer during construction to confirm bearing surfaces have been prepared in accordance with our recommendations. There may also be conditions observed during construction where fill or weathered glacial till soils are relatively dense, avoiding overexcavation and replacement. The geotechnical engineer can help verify and provide additional direction on this during construction.

Footing excavations should be performed using a smooth-edged bucket to limit bearing surface disturbance. The foundation bearing surface must be confirmed or compacted as necessary to a firm, nonyielding condition. Loose, disturbed, or organic-rich materials present at the base of footing excavations

should be removed or compacted as discussed above. If soft or otherwise unsuitable areas are revealed during evaluation that cannot be compacted to a stable and uniformly firm condition the following options may be considered: (1) the exposed soils be moisture conditioned and recompacted; or (2) the unsuitable soils be overexcavated and replaced with compacted structural fill, as needed; or (3) it may be possible to push, seat, and compact quarry spalls into the soft soils to stabilize the surface.

During periods of wet weather, concrete should be placed as soon as practical after preparation of the footing excavations. Foundation bearing surfaces should not be exposed to standing water. If water pools in the base of the excavation, it should be removed before placing structural fill or reinforcing steel. We provided an overexcavation recommendation for design and as such, we expect that this to also prove to be adequate protection for foundation bearing surfaces.

3.7.2. Foundation Design Parameters

3.7.2.1. Minimum Footing Depths and Dimensions

In general, exterior footings should be established at least 18 inches below the lowest adjacent grade. Interior footings should be founded a minimum of 12 inches below the top of the floor slab. Continuous footings should have a minimum width of 18 inches. Isolated column footings should have a minimum width of 24 inches. Mobile home manufacturers may have alternative recommendations for establishing footings or foundation strips. We recommend the bottoms of these elements, where applicable, also be established at least 18 inches below grade.

3.7.2.2. Allowable Soil Bearing Pressure

We recommend an allowable downward soil bearing pressure of 2,500 pounds per square foot (psf) be used for design of footings bearing on 16- to 18- inches of select granular structural fill overlying soil materials. The recommended allowable bearing pressures provided applies to the total of dead and long-term live loads and may be increased by one-third when considering total loads, including earthquake or wind loads. These are net bearing pressures. The weight of the footing and overlying backfill can be ignored in calculating footing sizes. If foundations are located within a distance of about 25 feet from the top of slopes steeper than about 6H:1V, we recommend we be contacted to determine if a reduced allowable soil bearing pressure may be appropriate or to provide alternative recommendations on embedment depths.

3.7.2.3. Foundation Settlement Estimates

We estimate settlement of footings bearing on surfaces prepared as recommend will be less than 1 inch, with differential settlements of less than ½ inch between comparably loaded isolated column footings or along 50 to 100 feet of continuous footing. Settlement is expected to occur rapidly as loads are applied.

3.7.2.4. Lateral Resistance

The ability of the soil to resist lateral loads is a function of frictional resistance, which can develop on the base of footings and slabs and the passive resistance, which can develop on the face of below-grade elements of the structure as these elements tend to move into the soil. For footings founded in accordance with the recommendations presented above, the allowable frictional resistance on the base of the footing may be computed using a coefficient of friction of 0.40 applied to the vertical dead-load forces. The allowable passive resistance on the face of the footing or other embedded foundation elements may be computed using an equivalent fluid density of 250 pounds per cubic foot (pcf) for undisturbed site soils or structural fill extending out from the face of the foundation element a distance at least equal to two and one-half times the depth of the element. These values include a factor of safety of about 1.5.

The passive earth pressure and friction components may be combined provided that the passive component does not exceed two-thirds of the total. The passive earth pressure value is based on the assumptions that the adjacent grade is level and that groundwater remains below the base of the footing throughout the year. The top foot of soil should be neglected when calculating passive lateral earth pressure unless the area adjacent to the foundation is covered with pavement or a slab-on-grade.

3.7.3. Foundation Drains

Based on our interpretation of the regional groundwater table, groundwater seepage conditions observed in our explorations and subsurface soil conditions, it is our opinion footing drains are not necessary to maintain bearing support. However, because of the potential for near-surface seepage during wetter times of the year and potential addition of water from irrigation and landscaping, perimeter footing drains are encouraged to maintain drier conditions around the structure and intercept water that could accumulate below the structure. Typical civil engineering designs with perforated pipes surrounded by gravel and fabrics are usually practical for most of these conditions. We can provide specific recommendations for the design of foundation drains, if requested.

3.8. Slab-on-Grade Floors

We do not anticipate floor slabs, other than typical garage would be needed for this project. Exposed slab subgrades should be evaluated after site grading is complete. In general, we recommend that building slabs be underlain by a minimum of 12-inches of select granular structural fill overlying proof compacted on-site materials.

If necessary, in our opinion, a modulus of subgrade reaction of 200 pounds per cubic inch (pci) can be used for designing a building floor slab, provided the slab subgrade is prepared as recommended. The 12-inch material section recommended can also substitute as a capillary break material, where needed.

We estimate settlement for slabs-on-grade constructed as recommended will be less than ¾ inch for a floor load of 100 psf. We estimate differential settlement of floor slabs will be ½ inch or less over a span of 50 feet for the same loading.

Based on our review of groundwater conditions, it is our opinion an underslab drain system is not necessary. However, if dry slabs are required (e.g., where adhesives are used to anchor carpet or tile to slab), a waterproof liner may be placed as a vapor barrier below the slab.

3.9. Stormwater Infiltration Assessment

Based on the subsurface conditions observed in our explorations, our experience, literature reviewed, and laboratory testing, it is our opinion that stormwater infiltration is generally infeasible for this project. We calculated stormwater infiltration rates using criteria and factors outlined in the 2019 SMMWW, as presented specifically for the sieve analysis methods, in conjunction with the sieve analysis results presented as Figure A-9. Results indicate long term (factored) infiltration rates on the order of 0.03 to 0.28 inches per hour, assuming sands with high silt content. In some instances, clay was also observed in the explorations, which would require adjustments in the factors and produce a lower rate.

We observed relatively consistent subsurface conditions in the explorations completed across this site. Generally, conditions varied somewhat from sandy silts to silty sands with the lowest percentage of fines in samples tested to be on the order of 42 percent, by weight. We envision that underlying soil below our

explorations to become more impermeable as density was observed to increase with depth. We would expect to encounter the Puget Group Sandstone materials below the depths of our explorations which would typically be less permeable than overlying materials tested.

If some smaller or shallower infiltration system are being considered, such as bioswales and permeable pavements, it is our opinion that these types of stormwater infiltration systems will be subject to increased maintenance and pre-mature failure due to the fine-grained nature of these materials at these shallow depths. Accordingly, we do not recommend that permeable pavements, bioswales, and/or infiltration systems be included as part of the proposed improvements for stormwater management.

4.0 LIMITATIONS

We have prepared this report for The Kirkbride Group, Inc. and other members of the design team for the proposed King County Housing Authority project in Black Diamond, Washington. Client may distribute copies of this report to authorized agents and regulatory agencies as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment, and experience. No warranty or other conditions, express or implied, should be understood. The limitations presented in our January 20, 2020 study also apply to this report.

Any electronic form, facsimile, or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to the appendix titled “Report Limitations and Guidelines for Use” for additional information pertaining to use of this report.

FIGURES

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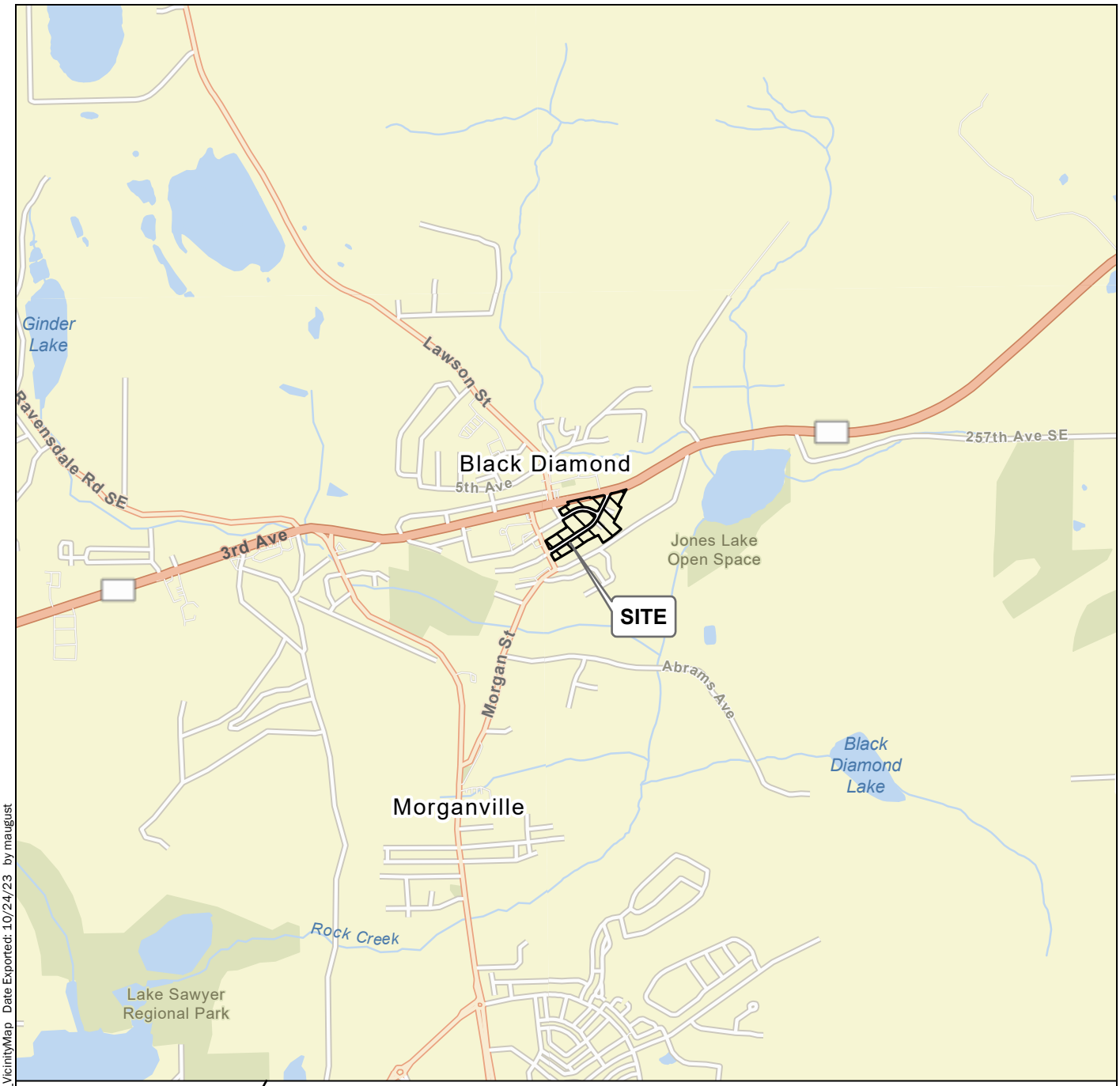

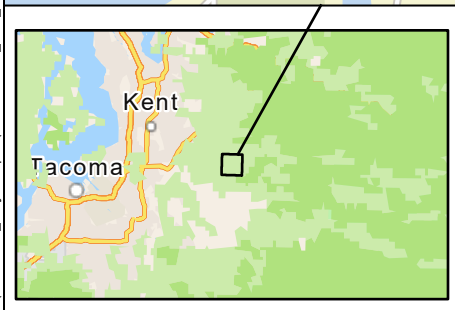

2,000 0 2,000

Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2018

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Rainier View Mobile Home Park
Black Diamond, Washington

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Figure 1

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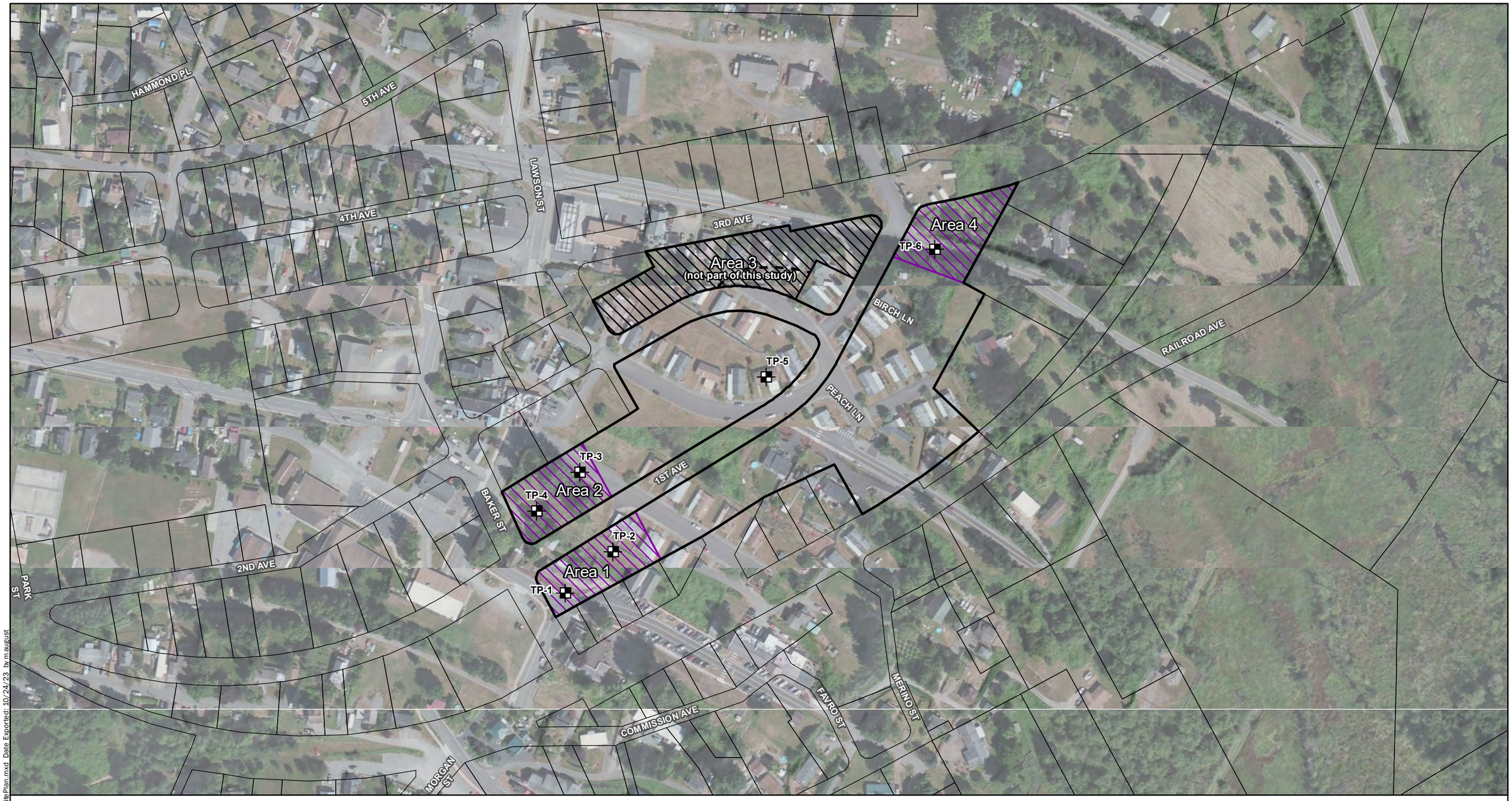

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: LiDAR from WA DNR. Parcels and roads from King County GIS. ESRI Clarity image.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- TP-1 — Approximate Location of Test Pit
- Site
- Proposed Expansion Areas
- King County Parcels

N W E S

200 0 200

Feet

Site Plan

Rainier View Mobile Home Park
Black Diamond, Washington

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Figure 2

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APPENDICES

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APPENDIX A
Subsurface Explorations and Laboratory Testing

APPENDIX A
SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface Explorations

Soil and groundwater conditions at the project site were explored by advancing test pits. Approximate locations of the explorations are shown in the Site Plan, Figure 2. Locations were determined in the field using an electronic tablet with global positioning system (GPS) software. Elevations are based on topographic contours included in the provided Construction Document drawings. The locations and elevations of the explorations should be considered approximate.

The explorations were continuously monitored by an engineer from our firm who examined and classified the soil encountered, obtained representative soil samples, maintained a detailed log of the explorations and observed groundwater conditions. Samples were retained in sealed plastic bags to prevent moisture loss. The soils were classified visually in general accordance with ASTM International (ASTM) D 2488 and Figure A-1. Figure A-1 includes a Key to the Exploration Logs.

Test pit excavations were performed using a tracked excavator provided and operated by Kelly's Excavating, Inc. After each test pit was complete the excavation was backfilled using the generated material and compacted using the bucket of the excavator. Summary logs of the test pits are presented as Figures A-2 through A-8. The densities noted on the test pit exploration logs are based on the difficulty of excavation, observations of caving and our experience and judgment.

Laboratory Testing

Soil samples obtained from the explorations were transported to the GeoEngineers laboratory. Representative soil samples were selected for laboratory tests to evaluate the pertinent geotechnical engineering characteristics of the soils and to confirm or modify our field classification. The following paragraphs provide a description of the tests performed.

Moisture Content (MC)

Moisture content of selected samples was determined in general accordance with ASTM Test Method D 2216. The test results are presented on the exploration logs, as indicated for the sample tested.

Percent Fines (%F)

Selected samples were "washed" through the U.S. No. 200 sieve to estimate the relative percentages of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve (fines). Tests were conducted in general accordance with ASTM D 1140. Test results are presented on the exploration logs at the respective sample depths.

Sieve Analysis (SA)

Sieve analyses were performed on selected samples in general accordance with ASTM Test Method D 6913. This test method covers the quantitative determination of the distribution of particle sizes in soils using sieve analysis. Typically, the distribution of particle sizes larger than 75 micrometers (μm) is determined by sieving. Figures A-11 and A-12 present the results of our sieve analyses.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel / Dames & Moore (D&M)

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Date Excavated 10/11/2023	Total Depth (ft) 8	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
			1		SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Dark brown silty fine sand with occasional gravel, organic matter and abundant fine roots (medium dense, moist) (fill)			
	1								
					SM	Brown with some oxidation silty fine sand with gravel and occasional cobbles (medium dense, moist)			
	2		2			Trace boulders, transitions to dense by 2 to 3 feet			Probe 1 to 2 inches at 2 feet Possible presence and increase in clay
	3					Occasional patches of gray			
	4		3						Probe 1 to 2 inches at 4 feet
	5								
	6								
	7								
			4 SA		ML	Gray silt with trace fine sand (very stiff, moist)	27	99	Practical refusal encountered at 7.5
	8								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-1

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-2
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 6	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Brown to dark brown silty fine to medium sand with gravel, occasional cobbles, some boulders and debris (medium dense, moist) (fill)			
	1								
	2		1						Probe 3 to 4 inches at 2 feet
	3								
	4		2						
					ML	Brown with occasional oxidation staining silty fine sand with gravel and occasional cobbles (dense, moist) (native)			Hard digging at 4 feet
	5								
	6		3						Practical refusal encountered at 6 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-2

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-3
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 4.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Brown silty fine sand with gravel and cobbles (loose, moist) (fill)			
	1				SM	Gray and brown silty fine sand with gravel and occasional cobbles (dense, moist)			
	2	✓	1						Probe 1 to 2 inches at 2 feet
	3								
	4	✓	2 SA				14	50	Very tight at 4 feet Practical refusal at 4.5 feet.

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-3

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-4
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 3.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
	1				SM	Grayish brown silty fine to medium sand with gravel, occasional cobbles and trace boulders (medium dense, moist) (fill)			
	2		1		SM	Brown silty fine sand with gravel (dense, moist)			
	3				SM	Brown and gray silty fine sand with occasional gravel (dense, moist)			2-inch steel utility found at 3 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-4

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-5
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 6.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)		Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
	1				SM	Brown silty fine sand with gravel and occasional cobbles (medium dense, moist) (fill)			
	2								
	3				SM	Light brown silty fine sand with gravel and cobbles (dense, moist to near dry)			Hard digging at 3 feet
	4		1						
	5								
	6		2						Practical refusal encountered at 6.5 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-4A

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-6
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 8	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Brown fine to medium sand with gravel, occasional cobbles and trace boulders (medium dense, moist) (fill)			
	1								
	2								
	3		1						
					SM	Brown and gray with moderate oxidation staining silty fine sand with gravel, occasional cobbles and trace boulders (dense, moist)			Probe 1 to 2 inches at 3 feet Hard digging at 3 feet
	4								
	5		2 SA			Becomes grayish brown	12	4	
	6					Blocks of cobbles and gravels at 6 to 7 feet			
	7		3						
			4						Practical refusal encountered at 8 feet
	8								

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-5

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-7
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 8.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Dark brown silty fine sand with gravel and occasional cobbles (medium dense, moist) (fill)			
	1								
	2								
	3		1						Probe 2 to 6 inches at 3 feet Concrete pipe at approximately 3 feet
	4								
	5								Steel pipe at approximately 4½ feet
					ML	Light brown sandy silt with gravel (stiff, moist)			
	6		2 SA				13	50	
	7								
	8		3			Becomes dense			

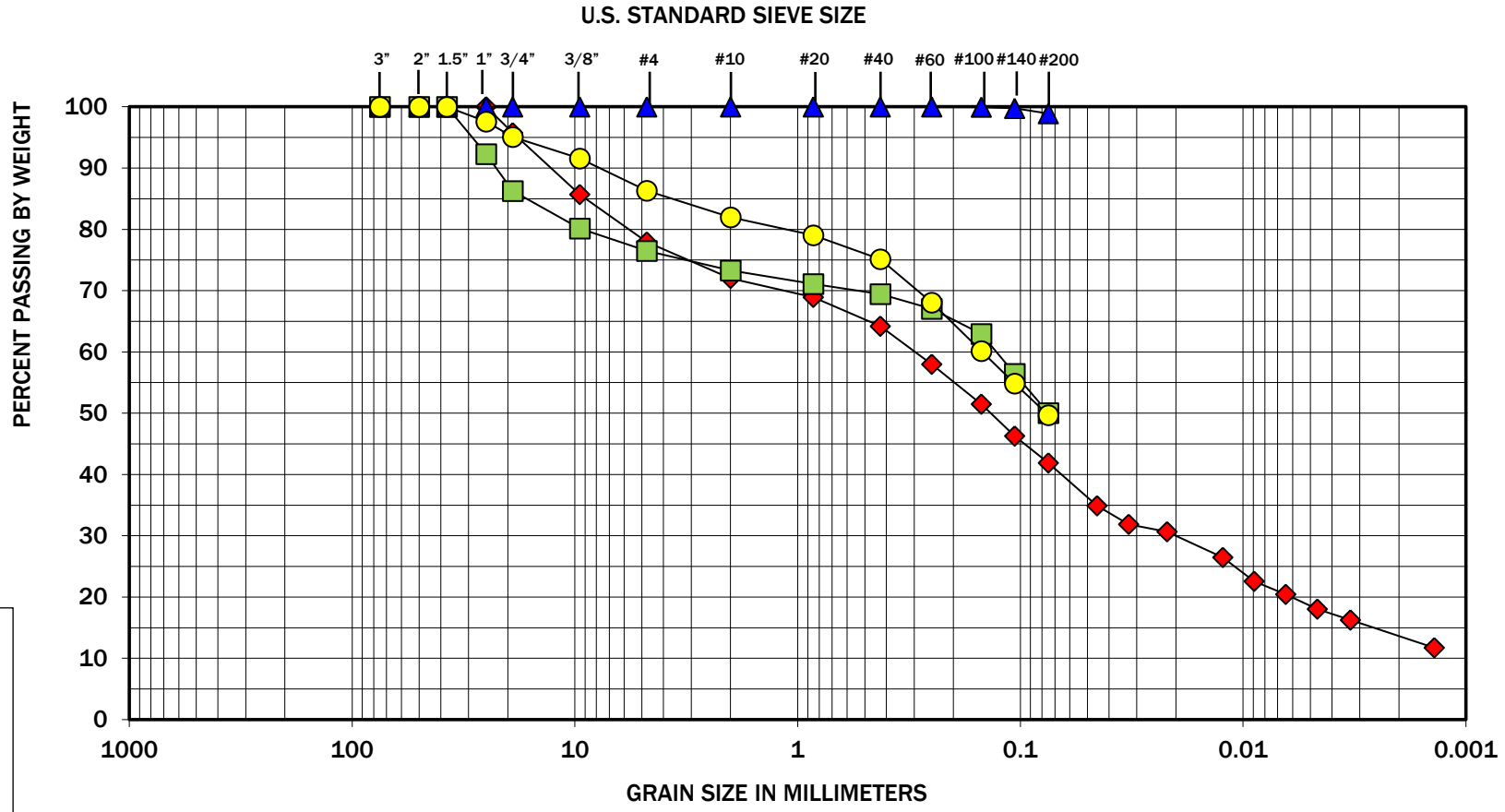
Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-6

GEOENGINEERS

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-8
Sheet 1 of 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-5	5	12	Silty sand with gravel (SM)
■	B-6	6	13	Sandy silt with gravel (ML)
▲	TP-1	7.5	27	Silt (ML)
●	TP-3	4	14	Silty sand (SM)

The grain size analysis results were obtained in general accordance with ASTM D6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

AASHTO ACCREDITED

GeoEngineers

Figure-A-9

Rainer View Mobile Home Park

Black Diamond, Washington

Sieve Analysis Results

APPENDIX B
Report Limitations and Guidelines for Use

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for The Kirkbride Group, Inc. and other members of the design team and for the Project(s) specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement with The Kirkbride Group, Inc. signed September 20, 2023 and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is based on a Unique Set of Project-Specific Factors

This report has been prepared for the proposed King County Housing Authority Rainier View Mobile Home Park Expansion project in Black Diamond, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;

1 Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- Advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- Encourages contractors to conduct additional study to obtain the specific types of information they need or prefer.

Contractors are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as

they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

Information Provided by Others

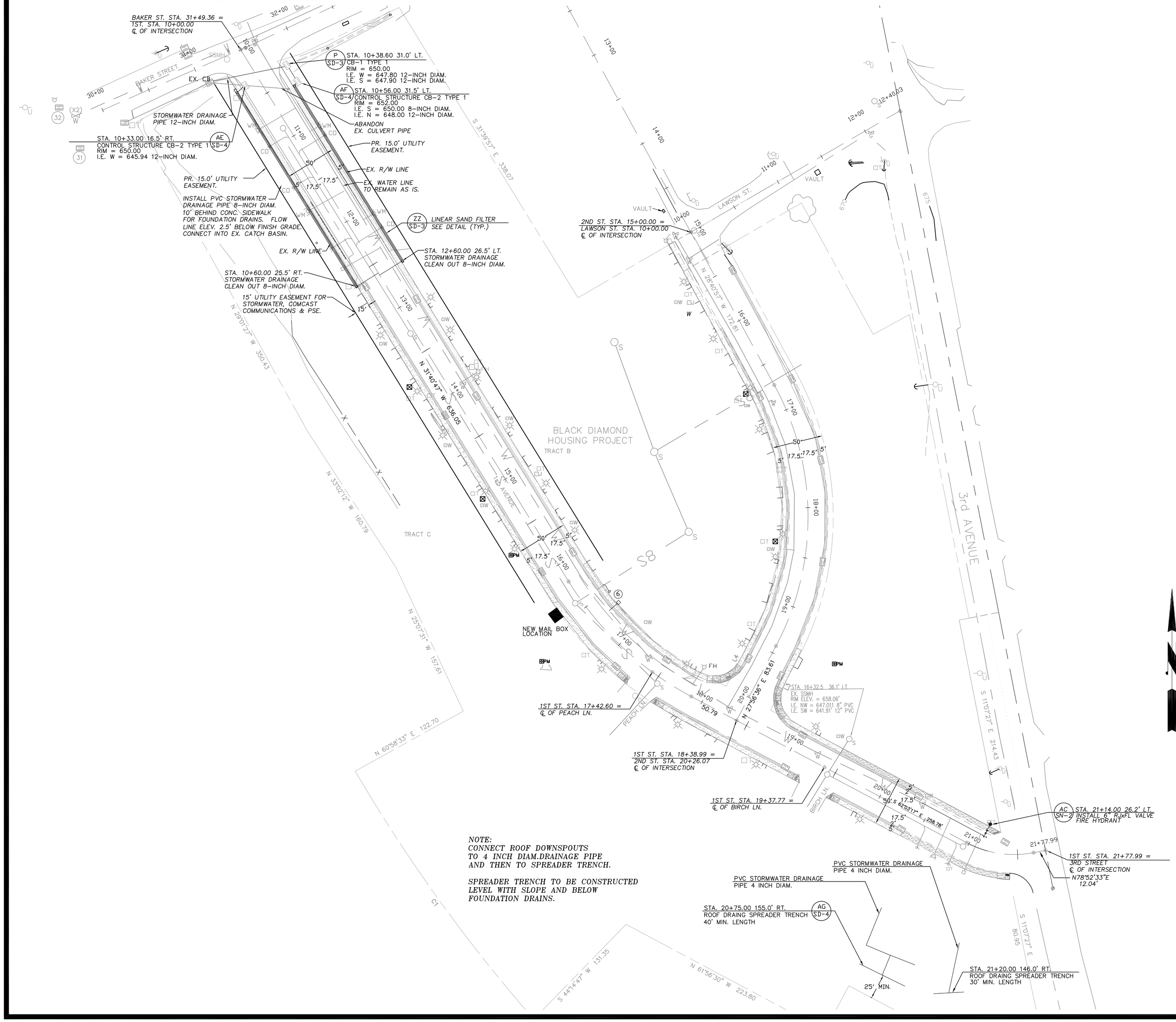
GeoEngineers has relied upon certain data or information provided or compiled by others in the performance of our services. Although we use sources that we reasonably believe to be trustworthy, GeoEngineers cannot warrant or guarantee the accuracy or completeness of information provided or compiled by others.

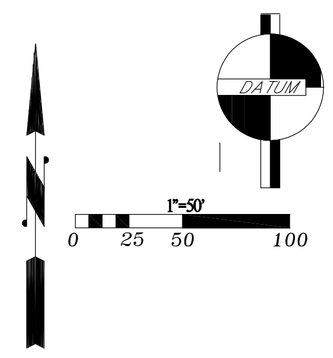
GeoEngineers

Appendix B
Vicinity Maps & Drawings

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK





VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
NORTHING: 114872.14
EASTING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying
FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

REVISION BLOCK:
2nd Revision

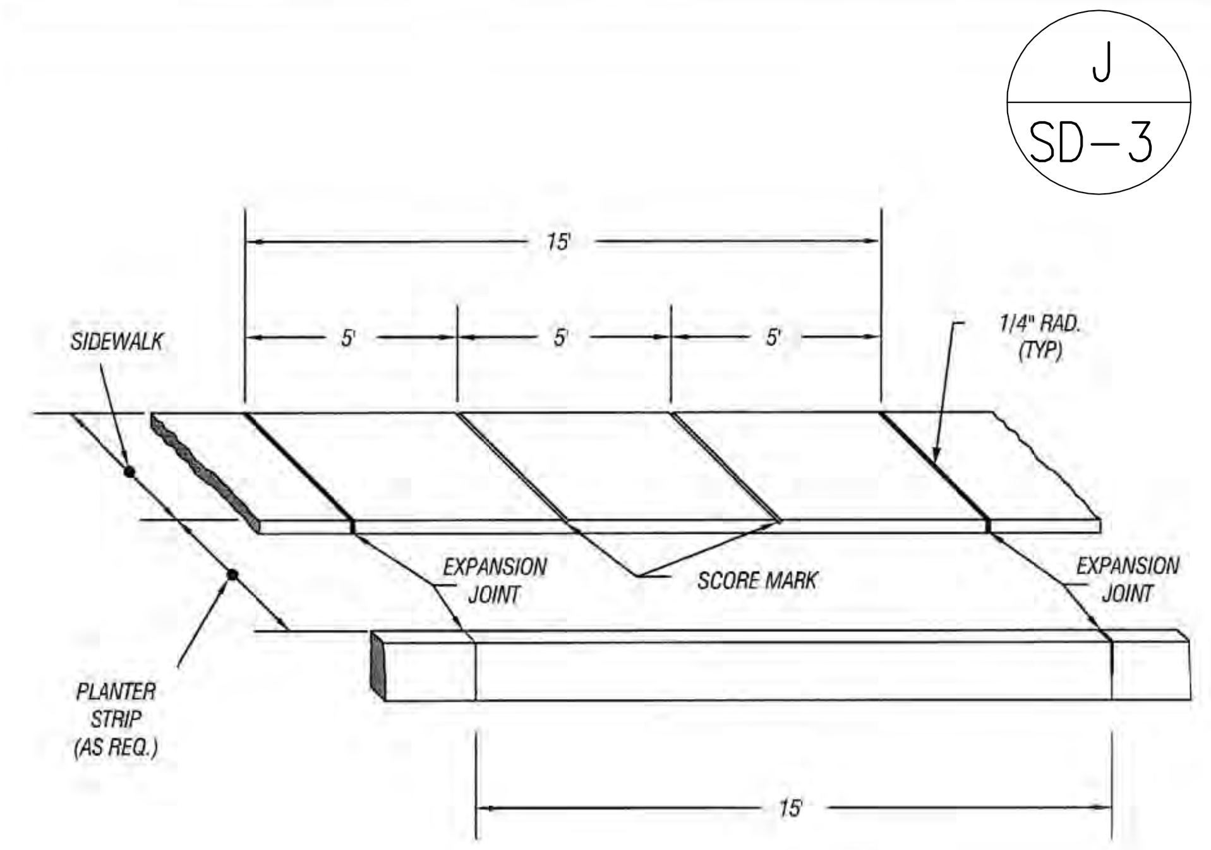
Turner Engineering Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Stormwater Site Plan

WILLIAM P. TURNER — STATE OF WASHINGTON — 33824 — REGISTERED PROFESSIONAL ENGINEER
1-10-24

SHEET ID CODE
SW 1 of 1

SHEET No.
6 of 19

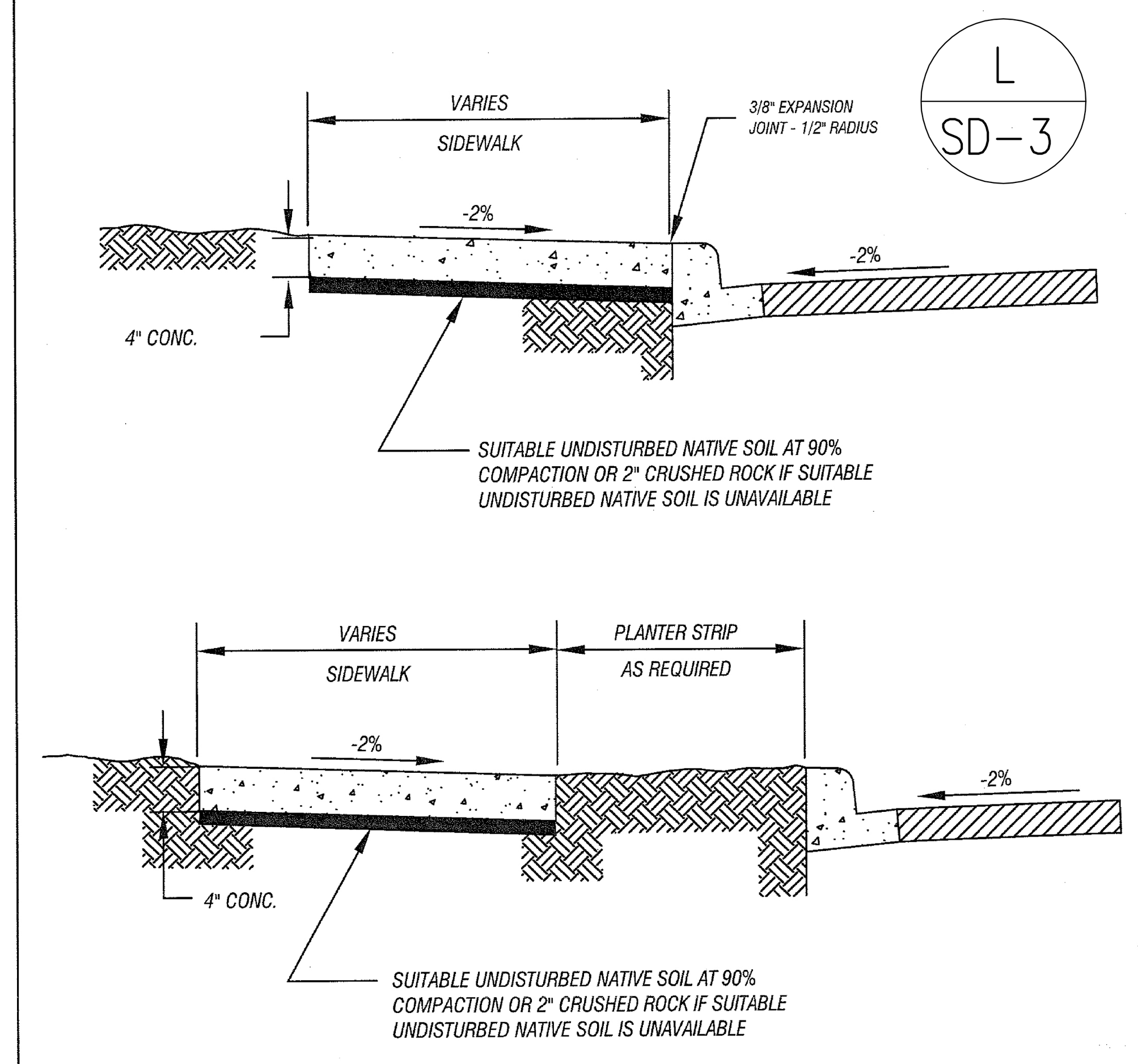


GENERAL NOTES:

1. EXPANSION JOINT MATERIAL TO BE 3/8" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE.
2. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE POURING CONCRETE.
3. SCORE MARKS SHALL BE ±1/8" WIDE BY ±1/4" DEEP. FOR SIDEWALKS OVER 8' IN WIDTH, A LONGITUDINAL SCORE MARK SHALL BE MADE ALONG CENTER OF WALK.
4. EXPANSION JOINTS SHALL BE INSTALLED IN CURB AND GUTTER AND IN SIDEWALK AT PC AND PT AT ALL CURB RETURNS. EXPANSION JOINTS SHALL BE PLACED IN SIDEWALK AT SAME LOCATIONS AS THOSE IN CURB AND GUTTER WHEN SIDEWALK IS ADJACENT TO CURB AND GUTTER, UNLESS OTHERWISE DIRECTED BY ENGINEER.

6-09-09

CITY OF BLACK DIAMOND	SIDEWALK SPACING			PWE PacWest Engineering Fife, Washington
	STANDARD DWG TR-15	NOT TO SCALE	04/01/09	

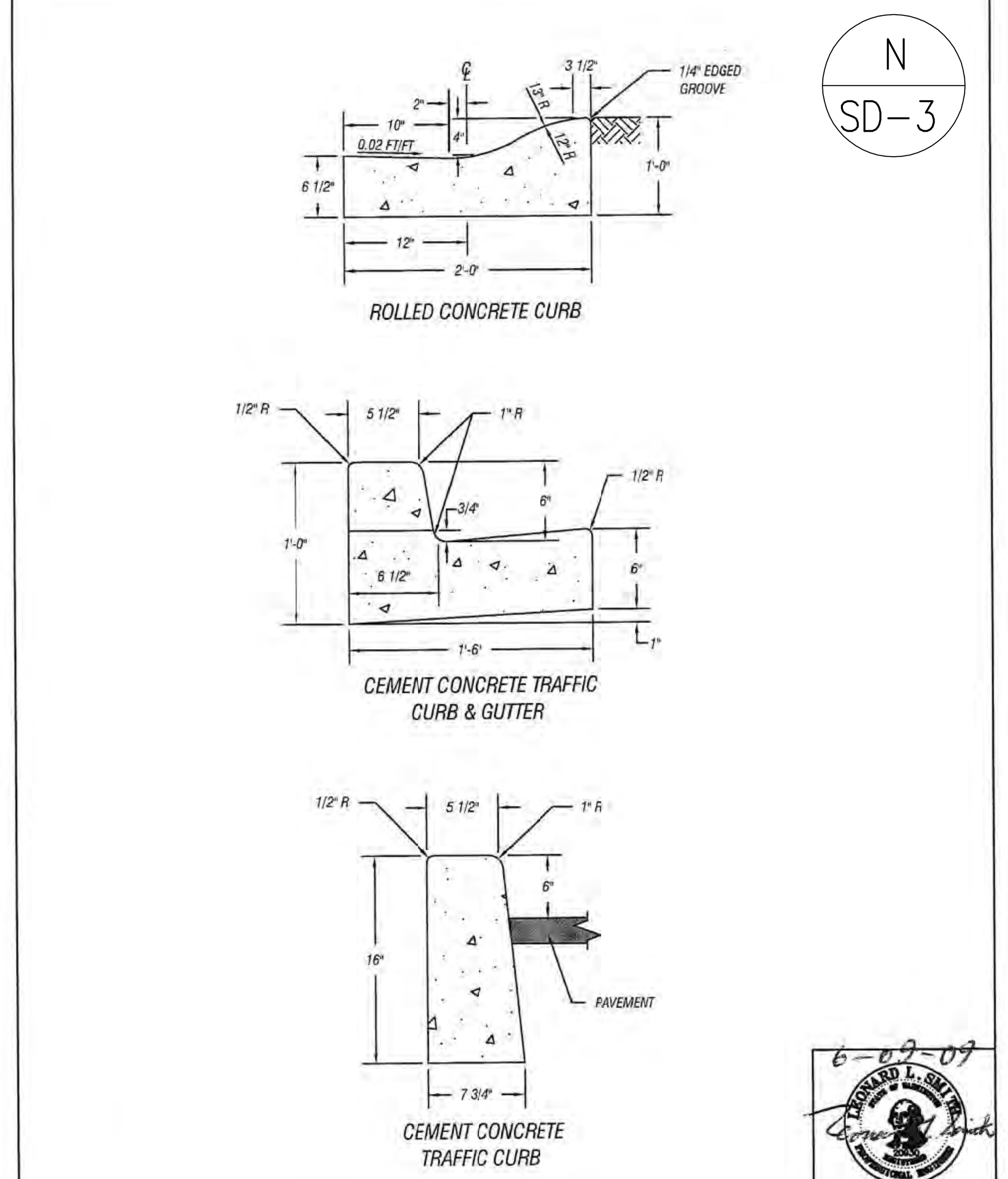


GENERAL NOTES:

1. CONCRETE DRIVEWAYS REQUIRE A MINIMUM DEPTH OF 6".
2. WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE, GRADE SHALL NOT DEVIATE MORE THAN 1/8 INCH, AND ALIGNMENT SHALL NOT VARY MORE THAN 1/4 INCH.

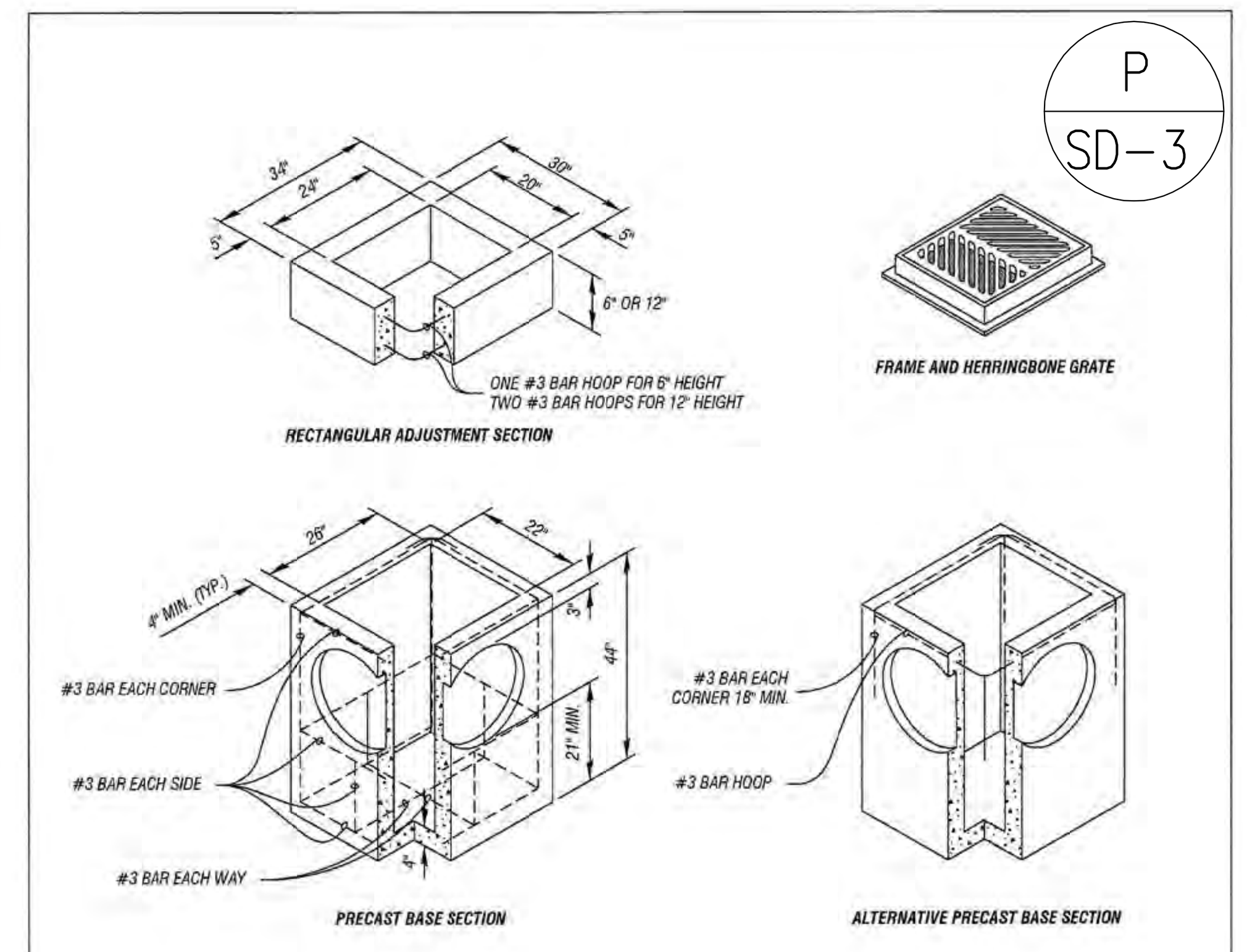
6-09-09

CITY OF BLACK DIAMOND	SIDEWALK			PWE PacWest Engineering Fife, Washington
	STANDARD DWG TR-14	NOT TO SCALE	04/01/09	



6-09-09

CITY OF BLACK DIAMOND	CONCRETE CURBS			PWE PacWest Engineering Fife, Washington
	STANDARD DWG TR-13	NOT TO SCALE	04/01/09	



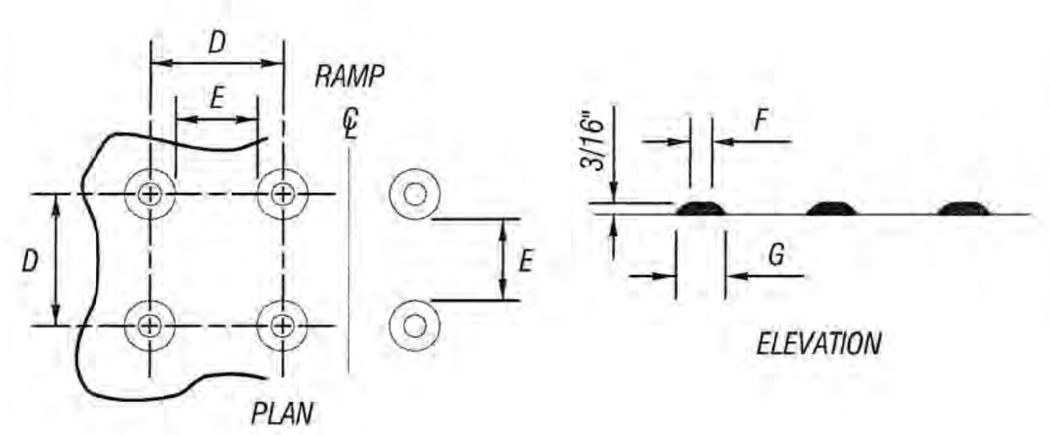
NOTES:

1. AS ACCEPTABLE ALTERNATIVES TO THE REBAR SHOWN IN THE PRECAST BASE SECTION, FIBERS (PLACED ACCORDING TO WSDOT STANDARD SPECIFICATIONS), OR WIRE MESH HAVING A MINIMUM AREA OF 0.12 SQUARE INCHES PER FOOT SHALL BE USED WITH THE MINIMUM REQUIRED REBAR SHOWN IN THE ALTERNATIVE PRECAST BASE SECTION. WIRE MESH SHALL NOT BE PLACED IN THE KNOCKOUTS.
2. THE KNOCKOUT DIAMETER SHALL NOT BE GREATER THAN 20". KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MINIMUM TO 2.5" MAXIMUM. PROVIDE A 1.5" MINIMUM GAP BETWEEN THE KNOCKOUT WALL AND THE OUTSIDE OF THE PIPE. AFTER THE PIPE IS INSTALLED, FILL THE GAP WITH JOINT MORTAR IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION.
3. THE MAXIMUM DEPTH FROM THE FINISHED GRADE TO THE LOWEST PIPE INVERT SHALL BE 5'.
4. THE FRAME AND GRATE MAY BE INSTALLED WITH THE FLANGE UP OR DOWN. THE FRAME MAY BE CAST INTO THE ADJUSTMENT SECTION.
5. THE PRECAST BASE SECTION MAY HAVE A ROUNDED FLOOR, AND THE WALLS MAY BE SLOPED AT A RATE OF 1:24 OR STEEPER.
6. THE OPENING SHALL BE MEASURED AT THE TOP OF THE PRECAST BASE SECTION.
7. ALL PICKUP HOLES SHALL BE GROUTED FULL AFTER THE BASIN HAS BEEN PLACED.

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
PVC	15"
HDPE	12"

6-04-09

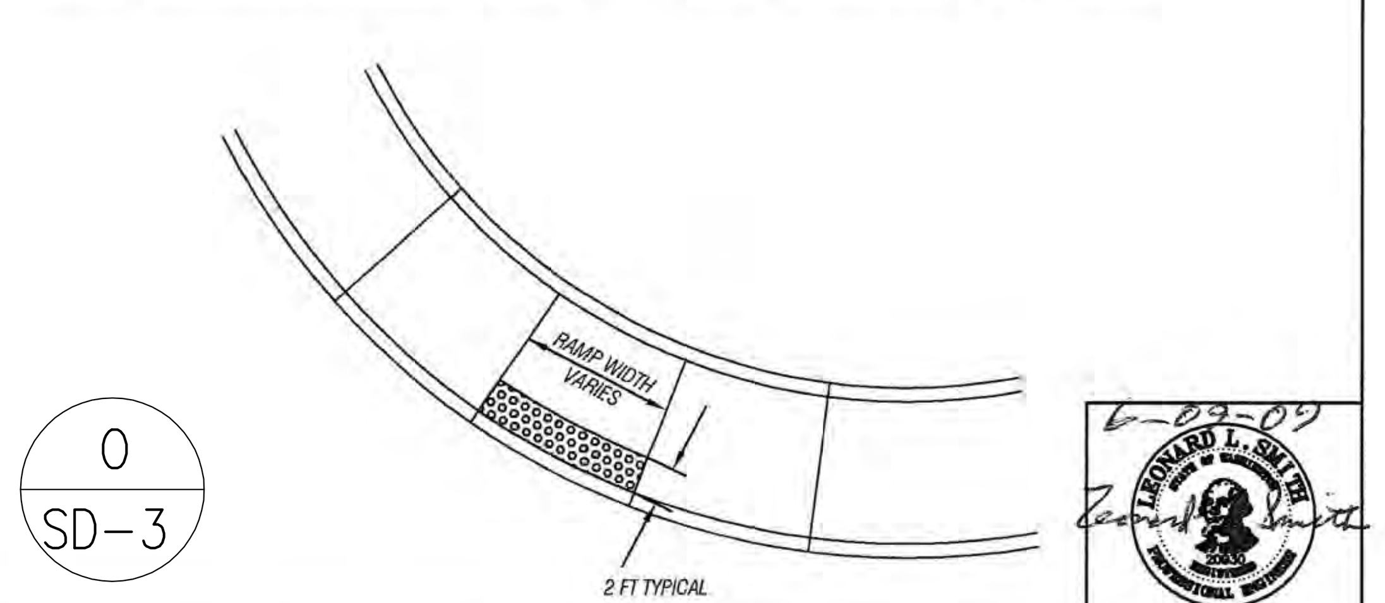
CITY OF BLACK DIAMOND	CATCH BASIN, TYPE 1			PWE PacWest Engineering Fife, Washington
	STANDARD DWG SD-1	NOT TO SCALE	01/01/08	



	MIN.	MAX.
D	1 5/8"	2 3/8"
E	5/8"	1 1/2"
F	7/16"	3/4"
G	7/8"	1 7/16"

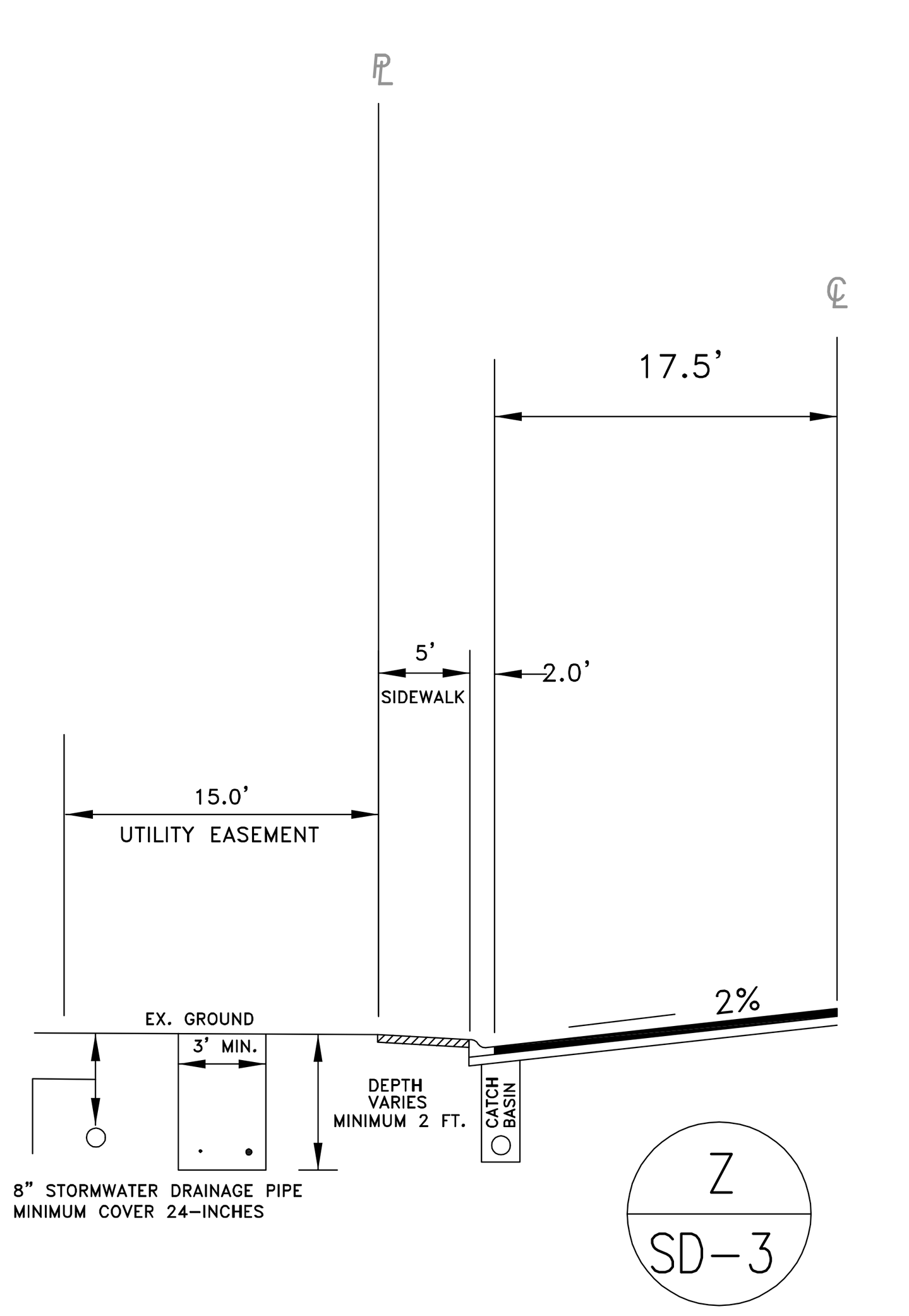
TRUNCATED DOMES
DETECTABLE WARNING
PATTERN DETAIL

NOTES:
1. DETECTABLE WARNING PATTERNS MAY BE CREATED BY ANY METHOD THAT WILL ACHIEVE THE TRUNCATED DOME DIMENSIONS AND SPACING SHOWN. THE DETECTABLE WARNING PATTERN AREA SHALL BE YELLOW, IN COMPLIANCE WITH WSDOT STANDARD SPECIFICATION 8-14.3(3).
2. THE COLOR CONTRAST SHALL MEET THE FEDERAL REQUIREMENTS AS DEFINED BY THE FOLLOWING: DETECTABLE WARNINGS ON WALKING SURFACES. THE MATERIAL USED TO PROVIDE CONTRAST SHOULD CONTRAST BY AT LEAST 70%. CONTRAST IN PERCENT IS DETERMINED BY: CONTRAST = ((A-B)/A)*100
A= LIGHT REFLECTANCE VALUE OF THE LIGHTER AREA AND B=LIGHT REFLECTANCE VALUE OF THE DARKER AREA.

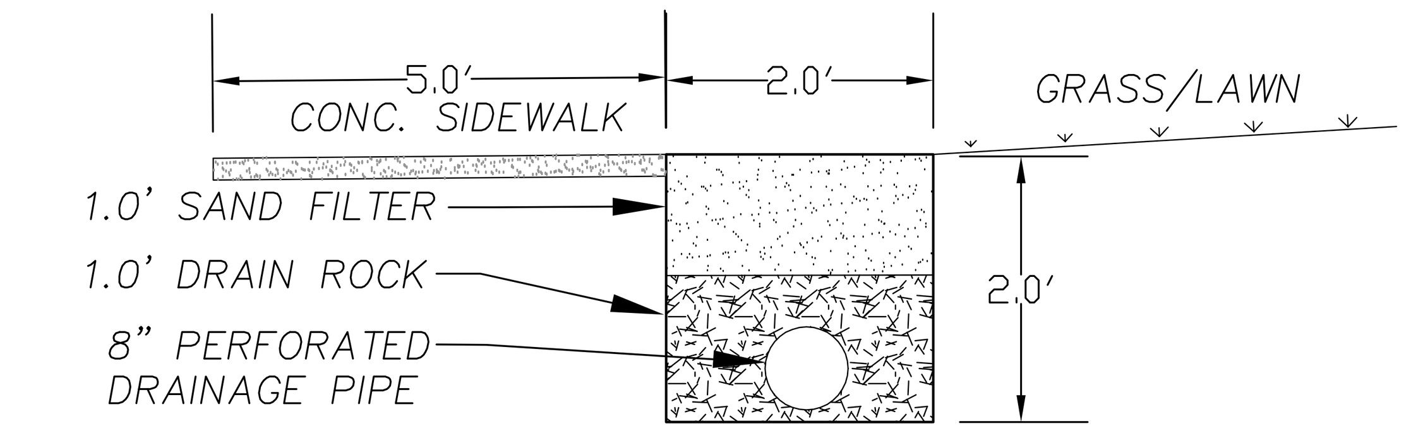


6-09-09

CITY OF BLACK DIAMOND	SIDEWALK ACCESS RAMP DETECTABLE WARNING PATTERN			PWE PacWest Engineering Fife, Washington
	STANDARD DWG TR-17	NOT TO SCALE	04/01/09	

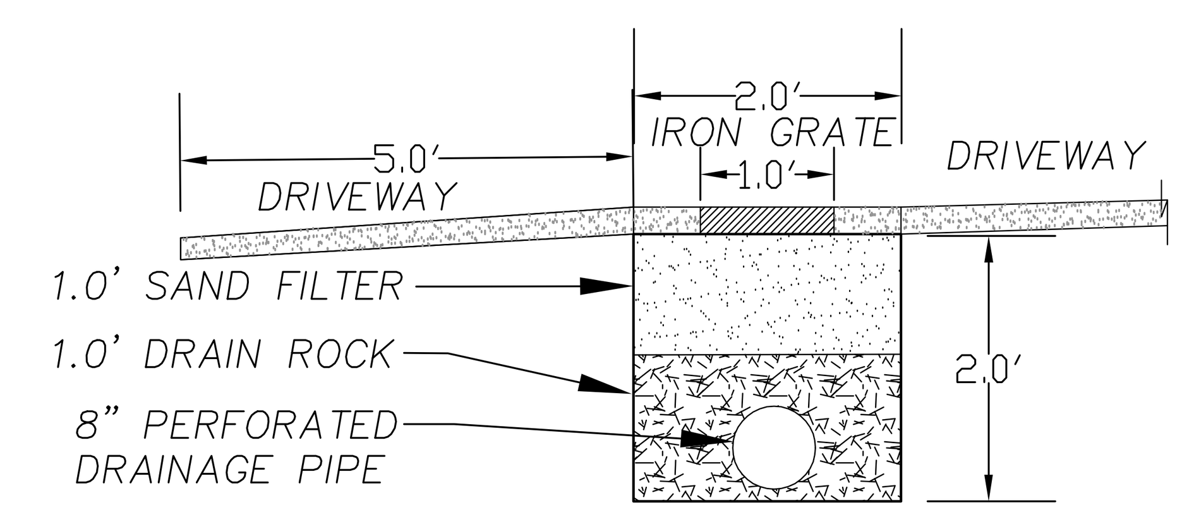


UTILITY TRENCH DETAIL
STORMWATER, COMCAST
COMMUNICATIONS, AND PSE



LINEAR FILTER STRIP
LANDSCAPED AREA
N.T.S.

ZZ
SD-3



LINEAR FILTER STRIP
DRIVEWAY SECTION
N.T.S.

APPROVED FOR CONSTRUCTION

BY: ______________________ DATE: ________
Signed, City Engineer

Approval Expires: ______________________

DESIGN INFORMATION	
PROJECT IDENTIFICATION No.	
FILE NAME:	BW-COVER SITE PLAN
ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

REVISION BLOCK:
2nd Revision

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Street & Stormwater Details

1-10-24

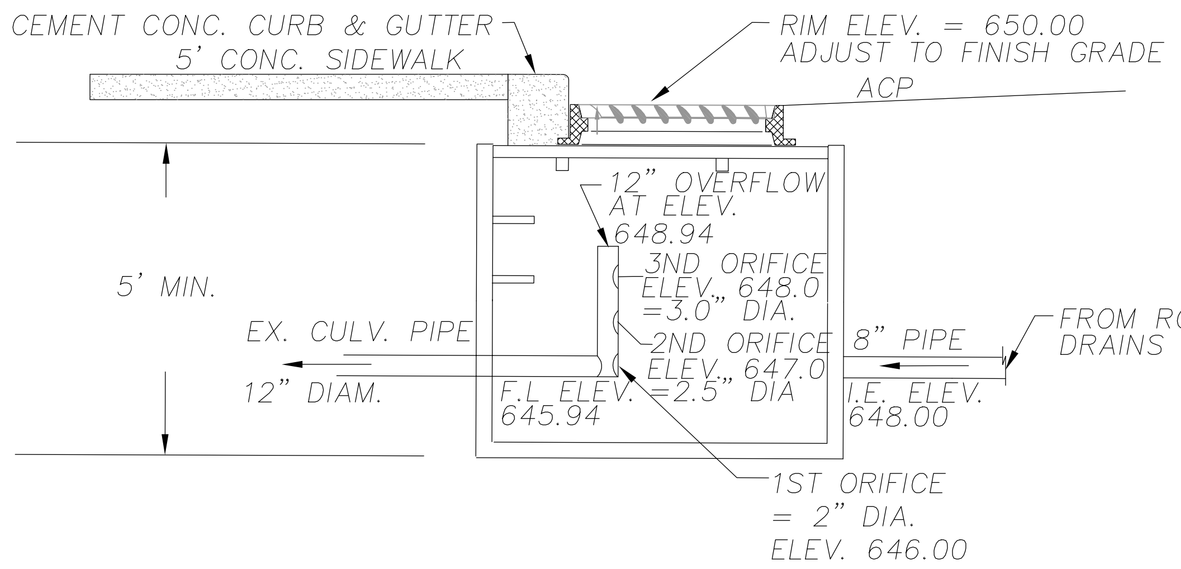
SHEET ID CODE
SD 3 of 4

SHEET No.
13 of 19

MULTIPLE ORIFICE DISCHARGE STRUCTURE

N.T.S N.T.S

STA. 10+33.00 16.5' RT.
CATCH BASIN – 2 TYPE 1L

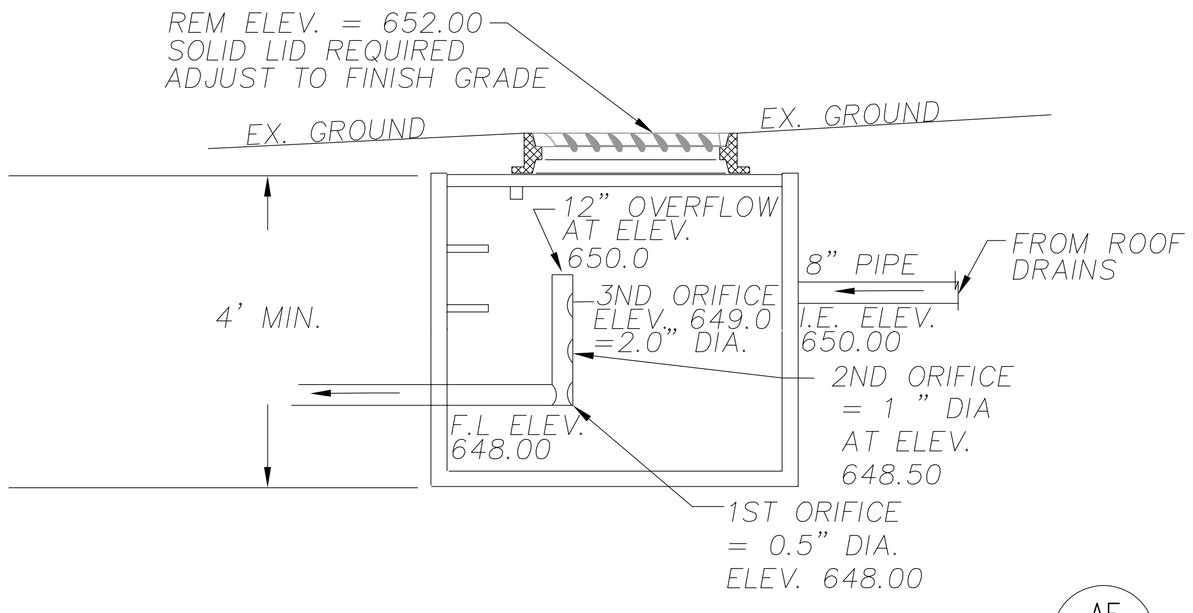


AE
SD-4

MULTIPLE ORIFICE DISCHARGE STRUCTURE

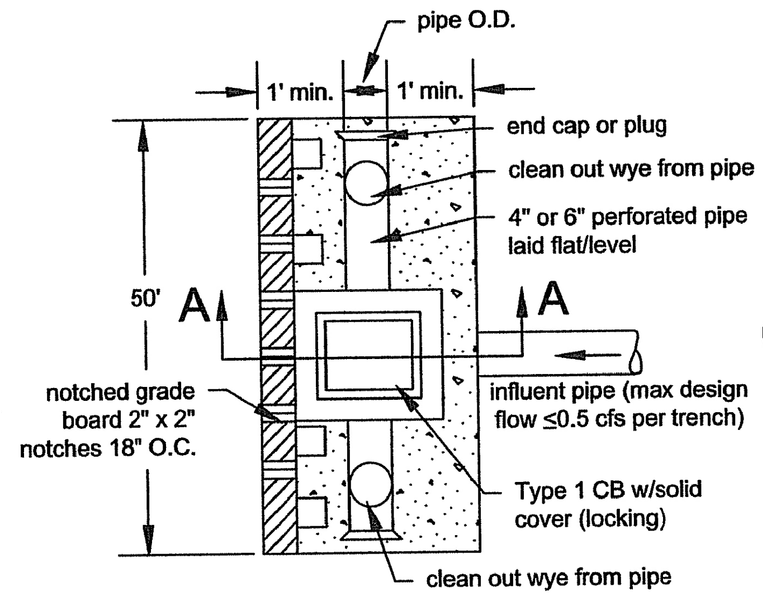
N.T.S

STA. 10+56.00 31.5' LT.
CATCH BASIN TYPE 1

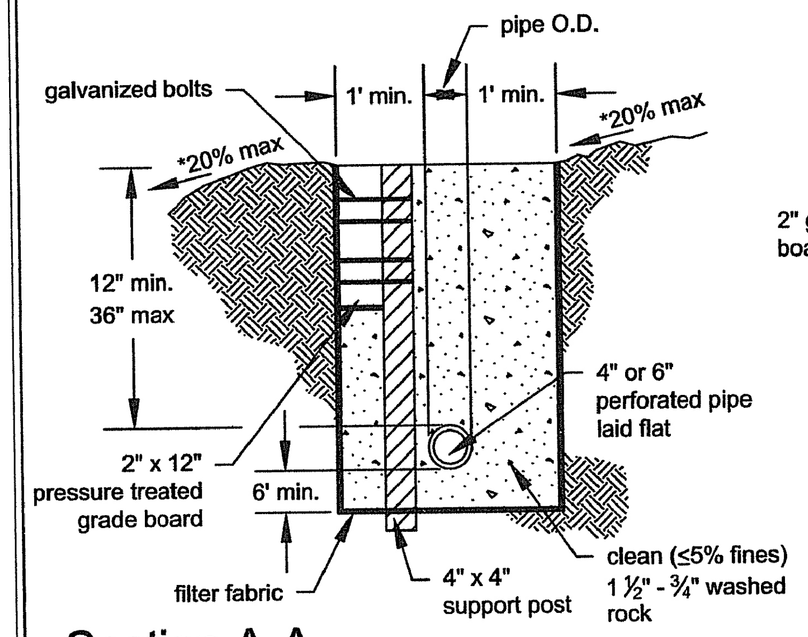


AF
SD-4

AG
SD-4

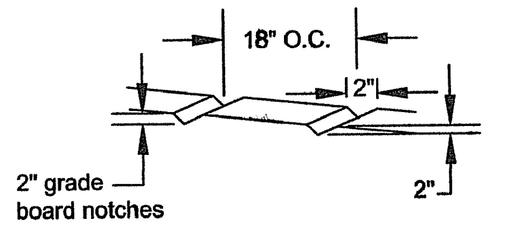


Plan

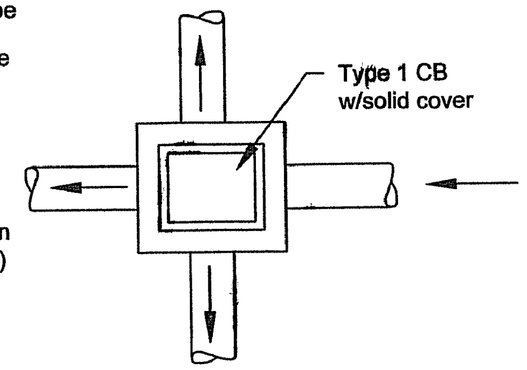


Section A-A

*15% max for flow control/runoff treatment in rural areas.



Flow to second dispersal trench if necessary



Flow to other branching CB's as necessary

Notes:
1. This trench shall be constructed so as to prevent point discharge and/or erosion.
2. Trenches may be placed no closer than 50 feet to one another. (100 feet along flowline)
3. Trench and grade board must be level. Align to follow contours of site.
4. Support post spacing as required by soil conditions to ensure grade board remains level.

NOT TO SCALE

DEPARTMENT OF ECOLOGY
State of Washington

Flow Dispersal Trench

Revised June 2017

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

REVISION BLOCK:
2nd Revision

Turner Engineering
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Street & Stormwater Details

WILLIAM P. TURNER
STATE OF WASHINGTON
23824
REGISTERED PROFESSIONAL ENGINEER

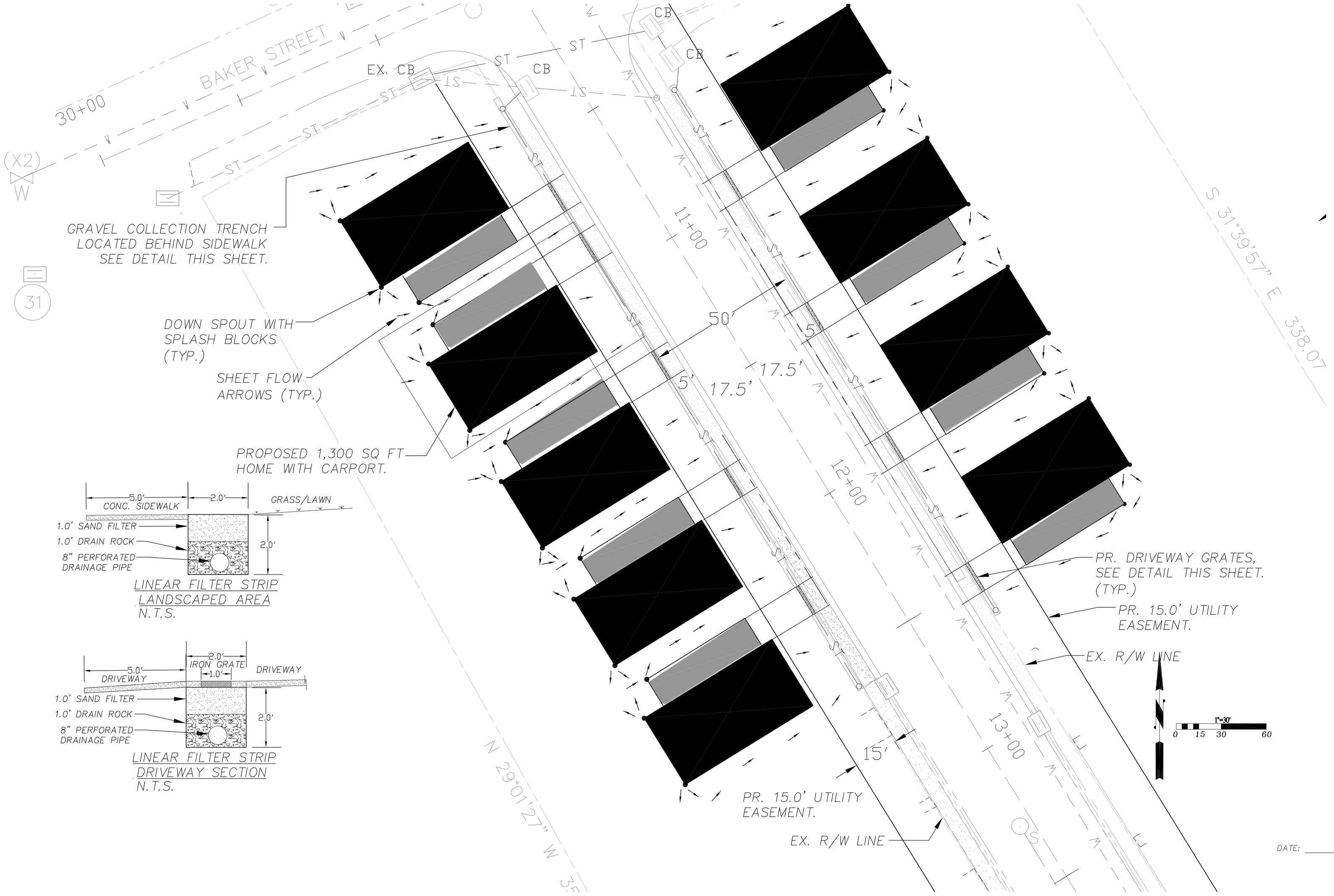
1-10-24

SHEET ID CODE
SD 4 of 4

SHEET No.
14 of 19

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



LINEAR FILTER STRIP
LANDSCAPED AREA
N.T.S.

LINEAR FILTER STRIP
DRIVEWAY SECTION
N.T.S.

DATE: _____

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	
DRAWN	
CHECKED	
PLOTTED DATES	

REVISION BLOCK:

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View
Manufactured Home Park
Stormwater Treatment Plan

SHEET ID CODE

SHEET No.

Appendix C
Hydraulic Calculations

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Black Diamond Sand Filter 12-26-23
Site Name:	Rainier View MHP
Site Address:	1st Street
City:	Black Diamond
Report Date:	1/10/2024
Gage:	Seatac
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.167
Version Date:	2018/10/10
Version:	4.2.16

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.397
Pervious Total	0.397
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.397

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.169
Pervious Total	0.169

Impervious Land Use	acre
ROOF TOPS FLAT	0.204
DRIVEWAYS FLAT	0.024
Impervious Total	0.228
Basin Total	0.397

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 1	Sand Filter 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	40.00 ft.	
Bottom Width:	40.00 ft.	
Depth:	2 ft.	
Volume at riser head:	0.0740 acre-feet.	
Infiltration On		
Infiltration rate:	4	
Infiltration safety factor:	1	
Total Volume Infiltrated (ac-ft.):		60.725
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		60.725
Percent Infiltrated:		100
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Side slope 1:	4 To 1	
Side slope 2:	4 To 1	
Side slope 3:	4 To 1	
Side slope 4:	4 To 1	
Discharge Structure		
Riser Height:	1.5 ft.	
Riser Diameter:	12 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.036	0.000	0.000	0.000
0.0222	0.037	0.000	0.000	0.148
0.0444	0.037	0.001	0.000	0.148
0.0667	0.037	0.002	0.000	0.148
0.0889	0.038	0.003	0.000	0.148
0.1111	0.038	0.004	0.000	0.148
0.1333	0.038	0.005	0.000	0.148
0.1556	0.039	0.005	0.000	0.148
0.1778	0.039	0.006	0.000	0.148
0.2000	0.039	0.007	0.000	0.148
0.2222	0.040	0.008	0.000	0.148
0.2444	0.040	0.009	0.000	0.148
0.2667	0.040	0.010	0.000	0.148
0.2889	0.041	0.011	0.000	0.148
0.3111	0.041	0.012	0.000	0.148
0.3333	0.041	0.013	0.000	0.148
0.3556	0.042	0.014	0.000	0.148
0.3778	0.042	0.015	0.000	0.148
0.4000	0.042	0.015	0.000	0.148
0.4222	0.043	0.016	0.000	0.148
0.4444	0.043	0.017	0.000	0.148
0.4667	0.043	0.018	0.000	0.148
0.4889	0.044	0.019	0.000	0.148
0.5111	0.044	0.020	0.000	0.148
0.5333	0.045	0.021	0.000	0.148
0.5556	0.045	0.022	0.000	0.148
0.5778	0.045	0.023	0.000	0.148

0.6000	0.046	0.024	0.000	0.148
0.6222	0.046	0.025	0.000	0.148
0.6444	0.046	0.026	0.000	0.148
0.6667	0.047	0.027	0.000	0.148
0.6889	0.047	0.028	0.000	0.148
0.7111	0.047	0.030	0.000	0.148
0.7333	0.048	0.031	0.000	0.148
0.7556	0.048	0.032	0.000	0.148
0.7778	0.049	0.033	0.000	0.148
0.8000	0.049	0.034	0.000	0.148
0.8222	0.049	0.035	0.000	0.148
0.8444	0.050	0.036	0.000	0.148
0.8667	0.050	0.037	0.000	0.148
0.8889	0.051	0.038	0.000	0.148
0.9111	0.051	0.039	0.000	0.148
0.9333	0.051	0.041	0.000	0.148
0.9556	0.052	0.042	0.000	0.148
0.9778	0.052	0.043	0.000	0.148
1.0000	0.052	0.044	0.000	0.148
1.0222	0.053	0.045	0.000	0.148
1.0444	0.053	0.046	0.000	0.148
1.0667	0.054	0.048	0.000	0.148
1.0889	0.054	0.049	0.000	0.148
1.1111	0.054	0.050	0.000	0.148
1.1333	0.055	0.051	0.000	0.148
1.1556	0.055	0.053	0.000	0.148
1.1778	0.056	0.054	0.000	0.148
1.2000	0.056	0.055	0.000	0.148
1.2222	0.056	0.056	0.000	0.148
1.2444	0.057	0.058	0.000	0.148
1.2667	0.057	0.059	0.000	0.148
1.2889	0.058	0.060	0.000	0.148
1.3111	0.058	0.061	0.000	0.148
1.3333	0.058	0.063	0.000	0.148
1.3556	0.059	0.064	0.000	0.148
1.3778	0.059	0.065	0.000	0.148
1.4000	0.060	0.067	0.000	0.148
1.4222	0.060	0.068	0.000	0.148
1.4444	0.061	0.069	0.000	0.148
1.4667	0.061	0.071	0.000	0.148
1.4889	0.061	0.072	0.000	0.148
1.5111	0.062	0.074	0.012	0.148
1.5333	0.062	0.075	0.064	0.148
1.5556	0.063	0.076	0.138	0.148
1.5778	0.063	0.078	0.229	0.148
1.6000	0.064	0.079	0.333	0.148
1.6222	0.064	0.081	0.448	0.148
1.6444	0.064	0.082	0.572	0.148
1.6667	0.065	0.083	0.703	0.148
1.6889	0.065	0.085	0.838	0.148
1.7111	0.066	0.086	0.976	0.148
1.7333	0.066	0.088	1.115	0.148
1.7556	0.067	0.089	1.251	0.148
1.7778	0.067	0.091	1.383	0.148
1.8000	0.067	0.092	1.509	0.148
1.8222	0.068	0.094	1.627	0.148
1.8444	0.068	0.095	1.736	0.148
1.8667	0.069	0.097	1.834	0.148

1.8889	0.069	0.098	1.921	0.148
1.9111	0.070	0.100	1.996	0.148
1.9333	0.070	0.102	2.060	0.148
1.9556	0.071	0.103	2.114	0.148
1.9778	0.071	0.105	2.160	0.148
2.0000	0.072	0.106	2.203	0.148
2.0222	0.072	0.108	2.276	0.148

Sand Filter 1

Bottom Length:	213.00 ft.
Bottom Width:	2.00 ft.
Depth:	1 ft.
Side slope 1:	0 To 1
Side slope 2:	0 To 1
Side slope 3:	0 To 1
Side slope 4:	0 To 1
Filtration On	
Hydraulic conductivity:	2
Depth of filter medium:	1
Total Volume Infiltrated (ac-ft.):	59.67
Total Volume Through Riser (ac-ft.):	1.049
Total Volume Through Facility (ac-ft.):	60.72
Percent Infiltrated:	98.27
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	0.7 ft.
Riser Diameter:	24 in.
Element Flows To:	
Outlet 1	Outlet 2
Tank 1	Tank 1

Sand Filter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.009	0.000	0.000	0.000
0.0111	0.009	0.000	0.000	0.019
0.0222	0.009	0.000	0.000	0.020
0.0333	0.009	0.000	0.000	0.020
0.0444	0.009	0.000	0.000	0.020
0.0556	0.009	0.000	0.000	0.020
0.0667	0.009	0.000	0.000	0.021
0.0778	0.009	0.000	0.000	0.021
0.0889	0.009	0.000	0.000	0.021
0.1000	0.009	0.001	0.000	0.021
0.1111	0.009	0.001	0.000	0.021
0.1222	0.009	0.001	0.000	0.022
0.1333	0.009	0.001	0.000	0.022
0.1444	0.009	0.001	0.000	0.022
0.1556	0.009	0.001	0.000	0.022
0.1667	0.009	0.001	0.000	0.023
0.1778	0.009	0.001	0.000	0.023
0.1889	0.009	0.001	0.000	0.023
0.2000	0.009	0.002	0.000	0.023
0.2111	0.009	0.002	0.000	0.023
0.2222	0.009	0.002	0.000	0.024
0.2333	0.009	0.002	0.000	0.024
0.2444	0.009	0.002	0.000	0.024
0.2556	0.009	0.002	0.000	0.024
0.2667	0.009	0.002	0.000	0.025
0.2778	0.009	0.002	0.000	0.025
0.2889	0.009	0.002	0.000	0.025
0.3000	0.009	0.002	0.000	0.025
0.3111	0.009	0.003	0.000	0.025
0.3222	0.009	0.003	0.000	0.026

0.3333	0.009	0.003	0.000	0.026
0.3444	0.009	0.003	0.000	0.026
0.3556	0.009	0.003	0.000	0.026
0.3667	0.009	0.003	0.000	0.027
0.3778	0.009	0.003	0.000	0.027
0.3889	0.009	0.003	0.000	0.027
0.4000	0.009	0.003	0.000	0.027
0.4111	0.009	0.004	0.000	0.027
0.4222	0.009	0.004	0.000	0.028
0.4333	0.009	0.004	0.000	0.028
0.4444	0.009	0.004	0.000	0.028
0.4556	0.009	0.004	0.000	0.028
0.4667	0.009	0.004	0.000	0.028
0.4778	0.009	0.004	0.000	0.029
0.4889	0.009	0.004	0.000	0.029
0.5000	0.009	0.004	0.000	0.029
0.5111	0.009	0.005	0.000	0.029
0.5222	0.009	0.005	0.000	0.030
0.5333	0.009	0.005	0.000	0.030
0.5444	0.009	0.005	0.000	0.030
0.5556	0.009	0.005	0.000	0.030
0.5667	0.009	0.005	0.000	0.030
0.5778	0.009	0.005	0.000	0.031
0.5889	0.009	0.005	0.000	0.031
0.6000	0.009	0.005	0.000	0.031
0.6111	0.009	0.006	0.000	0.031
0.6222	0.009	0.006	0.000	0.032
0.6333	0.009	0.006	0.000	0.032
0.6444	0.009	0.006	0.000	0.032
0.6556	0.009	0.006	0.000	0.032
0.6667	0.009	0.006	0.000	0.032
0.6778	0.009	0.006	0.000	0.033
0.6889	0.009	0.006	0.000	0.033
0.7000	0.009	0.006	0.000	0.033
0.7111	0.009	0.007	0.024	0.033
0.7222	0.009	0.007	0.070	0.034
0.7333	0.009	0.007	0.129	0.034
0.7444	0.009	0.007	0.198	0.034
0.7556	0.009	0.007	0.277	0.034
0.7667	0.009	0.007	0.365	0.034
0.7778	0.009	0.007	0.460	0.035
0.7889	0.009	0.007	0.561	0.035
0.8000	0.009	0.007	0.670	0.035
0.8111	0.009	0.007	0.784	0.035
0.8222	0.009	0.008	0.905	0.035
0.8333	0.009	0.008	1.030	0.036
0.8444	0.009	0.008	1.161	0.036
0.8556	0.009	0.008	1.297	0.036
0.8667	0.009	0.008	1.438	0.036
0.8778	0.009	0.008	1.583	0.037
0.8889	0.009	0.008	1.733	0.037
0.9000	0.009	0.008	1.886	0.037
0.9111	0.009	0.008	2.044	0.037
0.9222	0.009	0.009	2.205	0.037
0.9333	0.009	0.009	2.369	0.038
0.9444	0.009	0.009	2.537	0.038
0.9556	0.009	0.009	2.709	0.038
0.9667	0.009	0.009	2.883	0.038

0.9778	0.009	0.009	3.059	0.039
0.9889	0.009	0.009	3.239	0.039
1.0000	0.009	0.009	3.421	0.039
1.0111	0.009	0.009	3.605	0.039

Tank 1

Dimensions
Depth: 2.8 ft.
Tank Type: Circular
Diameter: 2.8 ft.
Length: 5 ft.
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 2 in. Elevation:0 ft.
Orifice 2 Diameter: 2.5 in. Elevation:1 ft.
Orifice 3 Diameter: 3 in. Elevation:2 ft.
Element Flows To:
Outlet 1 Outlet 2
Trapezoidal Pond 1

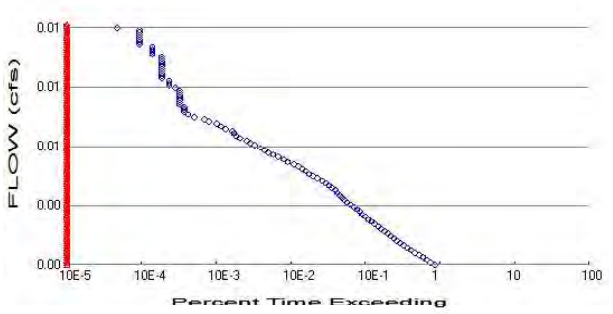
Tank Hydraulic Table

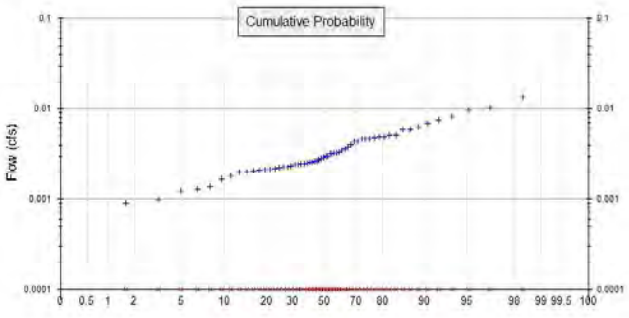
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000	0.000	0.000	0.000
0.0311	0.000	0.000	0.019	0.000
0.0622	0.000	0.000	0.027	0.000
0.0933	0.000	0.000	0.033	0.000
0.1244	0.000	0.000	0.038	0.000
0.1556	0.000	0.000	0.042	0.000
0.1867	0.000	0.000	0.046	0.000
0.2178	0.000	0.000	0.050	0.000
0.2489	0.000	0.000	0.054	0.000
0.2800	0.000	0.000	0.057	0.000
0.3111	0.000	0.000	0.060	0.000
0.3422	0.000	0.000	0.063	0.000
0.3733	0.000	0.000	0.066	0.000
0.4044	0.000	0.000	0.069	0.000
0.4356	0.000	0.000	0.071	0.000
0.4667	0.000	0.000	0.074	0.000
0.4978	0.000	0.000	0.076	0.000
0.5289	0.000	0.000	0.078	0.000
0.5600	0.000	0.000	0.081	0.000
0.5911	0.000	0.000	0.083	0.000
0.6222	0.000	0.000	0.085	0.000
0.6533	0.000	0.000	0.087	0.000
0.6844	0.000	0.000	0.089	0.000
0.7156	0.000	0.000	0.091	0.000
0.7467	0.000	0.000	0.093	0.000
0.7778	0.000	0.000	0.095	0.000
0.8089	0.000	0.000	0.097	0.000
0.8400	0.000	0.000	0.099	0.000
0.8711	0.000	0.000	0.101	0.000
0.9022	0.000	0.000	0.103	0.000
0.9333	0.000	0.000	0.104	0.000
0.9644	0.000	0.000	0.106	0.000
0.9956	0.000	0.000	0.108	0.000
1.0267	0.000	0.000	0.137	0.000
1.0578	0.000	0.000	0.152	0.000
1.0889	0.000	0.000	0.163	0.000
1.1200	0.000	0.000	0.173	0.000
1.1511	0.000	0.000	0.182	0.000

1.1822	0.000	0.000	0.190	0.000
1.2133	0.000	0.000	0.197	0.000
1.2444	0.000	0.000	0.204	0.000
1.2756	0.000	0.000	0.211	0.000
1.3067	0.000	0.000	0.218	0.000
1.3378	0.000	0.000	0.224	0.000
1.3689	0.000	0.000	0.230	0.000
1.4000	0.000	0.000	0.235	0.000
1.4311	0.000	0.000	0.241	0.000
1.4622	0.000	0.000	0.246	0.000
1.4933	0.000	0.000	0.251	0.000
1.5244	0.000	0.000	0.256	0.000
1.5556	0.000	0.000	0.261	0.000
1.5867	0.000	0.000	0.266	0.000
1.6178	0.000	0.000	0.271	0.000
1.6489	0.000	0.000	0.276	0.000
1.6800	0.000	0.000	0.280	0.000
1.7111	0.000	0.000	0.285	0.000
1.7422	0.000	0.000	0.289	0.000
1.7733	0.000	0.000	0.293	0.000
1.8044	0.000	0.000	0.297	0.000
1.8356	0.000	0.000	0.302	0.000
1.8667	0.000	0.000	0.306	0.000
1.8978	0.000	0.000	0.310	0.000
1.9289	0.000	0.000	0.314	0.000
1.9600	0.000	0.000	0.318	0.000
1.9911	0.000	0.000	0.322	0.000
2.0222	0.000	0.000	0.362	0.000
2.0533	0.000	0.000	0.386	0.000
2.0844	0.000	0.000	0.404	0.000
2.1156	0.000	0.000	0.420	0.000
2.1467	0.000	0.000	0.434	0.000
2.1778	0.000	0.000	0.447	0.000
2.2089	0.000	0.000	0.459	0.000
2.2400	0.000	0.000	0.471	0.000
2.2711	0.000	0.000	0.482	0.000
2.3022	0.000	0.000	0.492	0.000
2.3333	0.000	0.000	0.502	0.000
2.3644	0.000	0.000	0.512	0.000
2.3956	0.000	0.000	0.522	0.000
2.4267	0.000	0.000	0.531	0.000
2.4578	0.000	0.000	0.540	0.000
2.4889	0.000	0.000	0.549	0.000
2.5200	0.000	0.000	0.557	0.000
2.5511	0.000	0.000	0.565	0.000
2.5822	0.000	0.000	0.574	0.000
2.6133	0.000	0.000	0.582	0.000
2.6444	0.000	0.000	0.590	0.000
2.6756	0.000	0.000	0.597	0.000
2.7067	0.000	0.000	0.605	0.000
2.7378	0.000	0.000	0.613	0.000
2.7689	0.000	0.000	0.620	0.000
2.8000	0.000	0.000	0.627	0.000
2.8311	0.000	0.000	0.634	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.397
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.169
Total Impervious Area: 0.228

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.003086
5 year	0.005088
10 year	0.006608
25 year	0.008731
50 year	0.010454
100 year	0.012291

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.004	0.000
1950	0.004	0.000
1951	0.006	0.000
1952	0.002	0.000
1953	0.002	0.000
1954	0.003	0.000
1955	0.004	0.000
1956	0.003	0.000
1957	0.003	0.000
1958	0.003	0.000

1959	0.003	0.000
1960	0.005	0.000
1961	0.002	0.000
1962	0.002	0.000
1963	0.002	0.000
1964	0.003	0.000
1965	0.002	0.000
1966	0.002	0.000
1967	0.005	0.000
1968	0.003	0.000
1969	0.003	0.000
1970	0.002	0.000
1971	0.003	0.000
1972	0.005	0.000
1973	0.002	0.000
1974	0.003	0.000
1975	0.004	0.000
1976	0.003	0.000
1977	0.001	0.000
1978	0.002	0.000
1979	0.001	0.000
1980	0.007	0.000
1981	0.002	0.000
1982	0.005	0.000
1983	0.003	0.000
1984	0.002	0.000
1985	0.001	0.000
1986	0.005	0.000
1987	0.005	0.000
1988	0.002	0.000
1989	0.001	0.000
1990	0.013	0.000
1991	0.006	0.000
1992	0.002	0.000
1993	0.002	0.000
1994	0.001	0.000
1995	0.003	0.000
1996	0.008	0.000
1997	0.006	0.000
1998	0.002	0.000
1999	0.008	0.000
2000	0.002	0.000
2001	0.001	0.000
2002	0.003	0.000
2003	0.004	0.000
2004	0.005	0.000
2005	0.003	0.000
2006	0.003	0.000
2007	0.010	0.000
2008	0.010	0.000
2009	0.005	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0132	0.0000
2	0.0104	0.0000
3	0.0098	0.0000

4	0.0082	0.0000
5	0.0075	0.0000
6	0.0069	0.0000
7	0.0063	0.0000
8	0.0060	0.0000
9	0.0060	0.0000
10	0.0052	0.0000
11	0.0051	0.0000
12	0.0049	0.0000
13	0.0048	0.0000
14	0.0048	0.0000
15	0.0047	0.0000
16	0.0047	0.0000
17	0.0047	0.0000
18	0.0044	0.0000
19	0.0044	0.0000
20	0.0040	0.0000
21	0.0038	0.0000
22	0.0037	0.0000
23	0.0035	0.0000
24	0.0033	0.0000
25	0.0033	0.0000
26	0.0033	0.0000
27	0.0032	0.0000
28	0.0032	0.0000
29	0.0030	0.0000
30	0.0030	0.0000
31	0.0029	0.0000
32	0.0028	0.0000
33	0.0027	0.0000
34	0.0026	0.0000
35	0.0026	0.0000
36	0.0026	0.0000
37	0.0026	0.0000
38	0.0025	0.0000
39	0.0025	0.0000
40	0.0025	0.0000
41	0.0024	0.0000
42	0.0024	0.0000
43	0.0023	0.0000
44	0.0023	0.0000
45	0.0023	0.0000
46	0.0022	0.0000
47	0.0022	0.0000
48	0.0021	0.0000
49	0.0021	0.0000
50	0.0021	0.0000
51	0.0020	0.0000
52	0.0020	0.0000
53	0.0020	0.0000
54	0.0018	0.0000
55	0.0017	0.0000
56	0.0014	0.0000
57	0.0013	0.0000
58	0.0012	0.0000
59	0.0010	0.0000
60	0.0009	0.0000
61	0.0006	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0015	18446	0	0	Pass
0.0016	16091	0	0	Pass
0.0017	14316	0	0	Pass
0.0018	12692	0	0	Pass
0.0019	11178	0	0	Pass
0.0020	9882	0	0	Pass
0.0021	8814	0	0	Pass
0.0022	7835	0	0	Pass
0.0023	7005	0	0	Pass
0.0024	6290	0	0	Pass
0.0024	5679	0	0	Pass
0.0025	5168	0	0	Pass
0.0026	4697	0	0	Pass
0.0027	4278	0	0	Pass
0.0028	3903	0	0	Pass
0.0029	3527	0	0	Pass
0.0030	3183	0	0	Pass
0.0031	2864	0	0	Pass
0.0032	2592	0	0	Pass
0.0033	2353	0	0	Pass
0.0033	2138	0	0	Pass
0.0034	1951	0	0	Pass
0.0035	1795	0	0	Pass
0.0036	1669	0	0	Pass
0.0037	1514	0	0	Pass
0.0038	1343	0	0	Pass
0.0039	1223	0	0	Pass
0.0040	1123	0	0	Pass
0.0041	1042	0	0	Pass
0.0042	969	0	0	Pass
0.0042	910	0	0	Pass
0.0043	838	0	0	Pass
0.0044	766	0	0	Pass
0.0045	704	0	0	Pass
0.0046	633	0	0	Pass
0.0047	570	0	0	Pass
0.0048	488	0	0	Pass
0.0049	425	0	0	Pass
0.0050	376	0	0	Pass
0.0051	341	0	0	Pass
0.0051	307	0	0	Pass
0.0052	270	0	0	Pass
0.0053	235	0	0	Pass
0.0054	196	0	0	Pass
0.0055	171	0	0	Pass
0.0056	145	0	0	Pass
0.0057	125	0	0	Pass
0.0058	107	0	0	Pass
0.0059	95	0	0	Pass
0.0060	84	0	0	Pass
0.0060	71	0	0	Pass
0.0061	61	0	0	Pass
0.0062	55	0	0	Pass

0.0063	45	0	0	Pass
0.0064	40	0	0	Pass
0.0065	37	0	0	Pass
0.0066	35	0	0	Pass
0.0067	29	0	0	Pass
0.0068	25	0	0	Pass
0.0069	22	0	0	Pass
0.0069	17	0	0	Pass
0.0070	15	0	0	Pass
0.0071	11	0	0	Pass
0.0072	9	0	0	Pass
0.0073	8	0	0	Pass
0.0074	8	0	0	Pass
0.0075	8	0	0	Pass
0.0076	7	0	0	Pass
0.0077	7	0	0	Pass
0.0078	7	0	0	Pass
0.0078	7	0	0	Pass
0.0079	7	0	0	Pass
0.0080	7	0	0	Pass
0.0081	7	0	0	Pass
0.0082	6	0	0	Pass
0.0083	5	0	0	Pass
0.0084	5	0	0	Pass
0.0085	5	0	0	Pass
0.0086	4	0	0	Pass
0.0087	4	0	0	Pass
0.0087	4	0	0	Pass
0.0088	4	0	0	Pass
0.0089	4	0	0	Pass
0.0090	4	0	0	Pass
0.0091	4	0	0	Pass
0.0092	4	0	0	Pass
0.0093	4	0	0	Pass
0.0094	4	0	0	Pass
0.0095	3	0	0	Pass
0.0096	3	0	0	Pass
0.0096	3	0	0	Pass
0.0097	3	0	0	Pass
0.0098	2	0	0	Pass
0.0099	2	0	0	Pass
0.0100	2	0	0	Pass
0.0101	2	0	0	Pass
0.0102	2	0	0	Pass
0.0103	2	0	0	Pass
0.0104	2	0	0	Pass
0.0105	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	55.26			☐	100.00			
Tank 1	☐	55.26			☐	0.00			
Sand Filter 1	☐	55.25			☐	0.00			
Total Volume Infiltrated		165.77	0.00	0.00		33.33	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

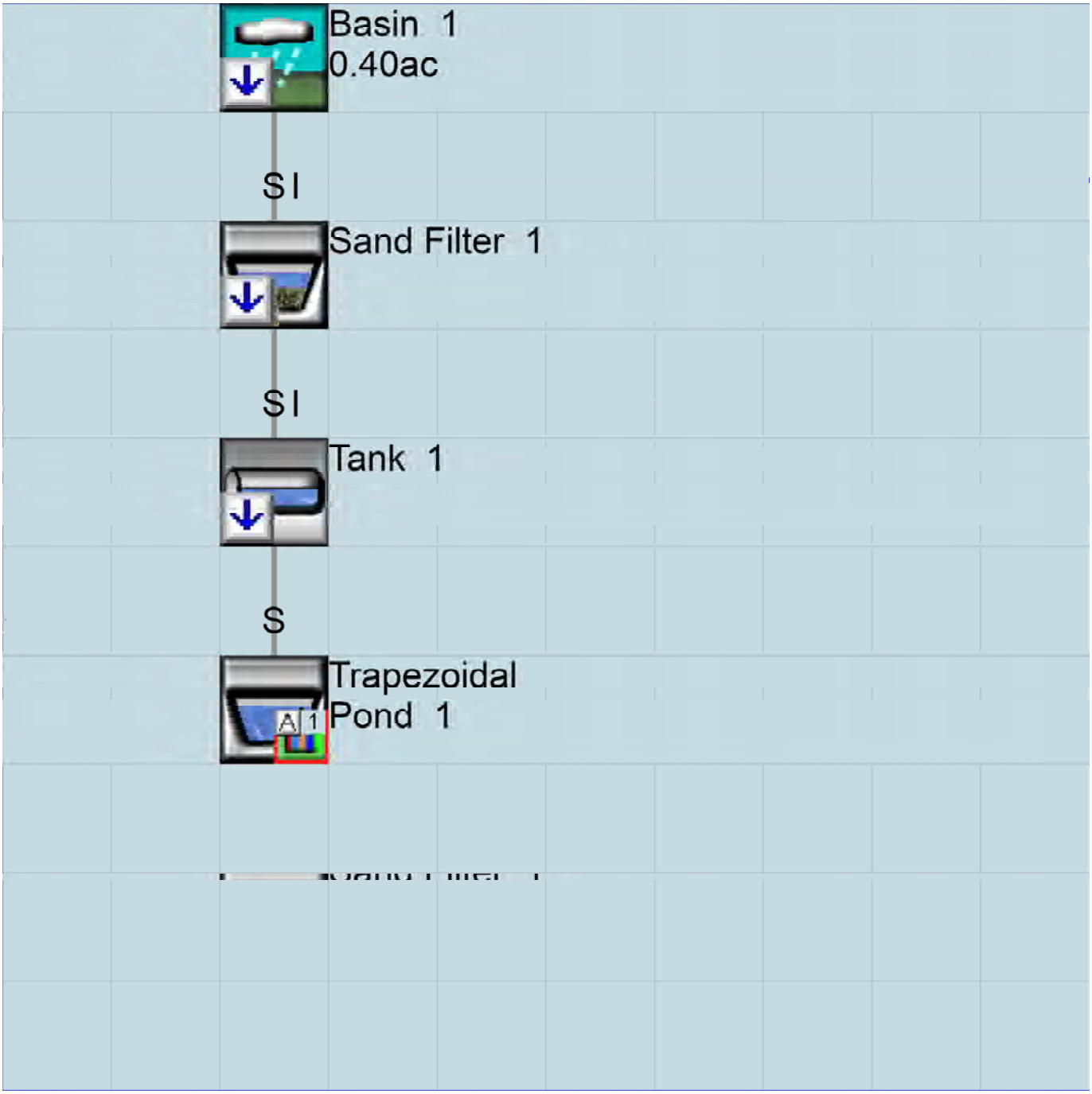
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Black Diamond Sand Filter 12-26-23.wdm
MESSU       25   PreBlack Diamond Sand Filter 12-26-23.MES
            27   PreBlack Diamond Sand Filter 12-26-23.L61
            28   PreBlack Diamond Sand Filter 12-26-23.L62
            30   POCBlack Diamond Sand Filter 12-26-231.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       0.079     COPY   501     12
PERLND  10                       0.079     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.167          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Black Diamond Sand Filter 12-26-23.wdm
MESSU       25   MitBlack Diamond Sand Filter 12-26-23.MES
            27   MitBlack Diamond Sand Filter 12-26-23.L61
            28   MitBlack Diamond Sand Filter 12-26-23.L62
            30   POCBlack Diamond Sand Filter 12-26-231.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       4
      IMPLND       5
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   16              0         0         0         0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
    5      DRIVEWAYS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    4         0    0    0    0    0
    5         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
```

```
    <PLS >       IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    4              0         0
    5              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4              0         0
    5              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  16                       0.169     RCHRES   1      2
PERLND  16                       0.169     RCHRES   1      3
IMPLND   4                       0.204     RCHRES   1      5
IMPLND   5                       0.024     RCHRES   1      5

******Routing******
RCHRES   1                             1     RCHRES   2      7
RCHRES   1                             1     RCHRES   2      8
RCHRES   2                             1     RCHRES   3      6
RCHRES   2                                   COPY     1     16
RCHRES   3                             1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                         in  out                            ***
    1     Sand Filter  1          2    1    1    1   28    0    1
    2     Tank  1                 1    1    1    1   28    0    1
    3     Trapezoidal Pond-016    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR      KS       DB50       ***
  <------><--------><--------><--------><--------><--------><--------->      ***
    1              1      0.04       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft     for each possible exit        for each possible exit
  <------><--------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      3
   91    5
     Depth      Area     Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)    (acres) (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.036731  0.000000  0.000000  0.000000
  0.022222  0.037058  0.000820  0.000000  0.148148
  0.044444  0.037387  0.001647  0.000000  0.148148
  0.066667  0.037717  0.002482  0.000000  0.148148
  0.088889  0.038049  0.003323  0.000000  0.148148
  0.111111  0.038382  0.004173  0.000000  0.148148
  0.133333  0.038716  0.005029  0.000000  0.148148
  0.155556  0.039052  0.005893  0.000000  0.148148
  0.177778  0.039389  0.006765  0.000000  0.148148
  0.200000  0.039728  0.007644  0.000000  0.148148
  0.222222  0.040068  0.008531  0.000000  0.148148
  0.244444  0.040410  0.009425  0.000000  0.148148
  0.266667  0.040753  0.010327  0.000000  0.148148
  0.288889  0.041098  0.011236  0.000000  0.148148
  0.311111  0.041444  0.012153  0.000000  0.148148
  0.333333  0.041792  0.013078  0.000000  0.148148
  0.355556  0.042141  0.014011  0.000000  0.148148
  0.377778  0.042491  0.014951  0.000000  0.148148
  0.400000  0.042843  0.015899  0.000000  0.148148
  0.422222  0.043196  0.016855  0.000000  0.148148
  0.444444  0.043551  0.017819  0.000000  0.148148
  0.466667  0.043907  0.018791  0.000000  0.148148
  0.488889  0.044265  0.019770  0.000000  0.148148
  0.511111  0.044624  0.020758  0.000000  0.148148
  0.533333  0.044985  0.021754  0.000000  0.148148
  0.555556  0.045347  0.022757  0.000000  0.148148
  0.577778  0.045710  0.023769  0.000000  0.148148
  0.600000  0.046075  0.024789  0.000000  0.148148
```

```
0.622222  0.046442  0.025817  0.000000  0.148148
0.644444  0.046810  0.026853  0.000000  0.148148
0.666667  0.047179  0.027897  0.000000  0.148148
0.688889  0.047550  0.028950  0.000000  0.148148
0.711111  0.047922  0.030011  0.000000  0.148148
0.733333  0.048295  0.031080  0.000000  0.148148
0.755556  0.048671  0.032157  0.000000  0.148148
0.777778  0.049047  0.033243  0.000000  0.148148
0.800000  0.049425  0.034337  0.000000  0.148148
0.822222  0.049805  0.035440  0.000000  0.148148
0.844444  0.050186  0.036551  0.000000  0.148148
0.866667  0.050568  0.037670  0.000000  0.148148
0.888889  0.050952  0.038798  0.000000  0.148148
0.911111  0.051337  0.039935  0.000000  0.148148
0.933333  0.051724  0.041080  0.000000  0.148148
0.955556  0.052112  0.042234  0.000000  0.148148
0.977778  0.052501  0.043396  0.000000  0.148148
1.000000  0.052893  0.044567  0.000000  0.148148
1.022222  0.053285  0.045747  0.000000  0.148148
1.044444  0.053679  0.046935  0.000000  0.148148
1.066667  0.054074  0.048133  0.000000  0.148148
1.088889  0.054471  0.049339  0.000000  0.148148
1.111111  0.054870  0.050553  0.000000  0.148148
1.133333  0.055269  0.051777  0.000000  0.148148
1.155556  0.055671  0.053010  0.000000  0.148148
1.177778  0.056073  0.054252  0.000000  0.148148
1.200000  0.056478  0.055502  0.000000  0.148148
1.222222  0.056883  0.056762  0.000000  0.148148
1.244444  0.057290  0.058030  0.000000  0.148148
1.266667  0.057699  0.059308  0.000000  0.148148
1.288889  0.058109  0.060595  0.000000  0.148148
1.311111  0.058520  0.061890  0.000000  0.148148
1.333333  0.058933  0.063196  0.000000  0.148148
1.355556  0.059347  0.064510  0.000000  0.148148
1.377778  0.059763  0.065833  0.000000  0.148148
1.400000  0.060180  0.067166  0.000000  0.148148
1.422222  0.060599  0.068508  0.000000  0.148148
1.444444  0.061019  0.069859  0.000000  0.148148
1.466667  0.061440  0.071220  0.000000  0.148148
1.488889  0.061863  0.072590  0.000000  0.148148
1.511111  0.062288  0.073969  0.012432  0.148148
1.533333  0.062714  0.075358  0.064540  0.148148
1.555556  0.063141  0.076757  0.138729  0.148148
1.577778  0.063570  0.078165  0.229424  0.148148
1.600000  0.064000  0.079582  0.333520  0.148148
1.622222  0.064432  0.081009  0.448641  0.148148
1.644444  0.064865  0.082446  0.572643  0.148148
1.666667  0.065299  0.083892  0.703432  0.148148
1.688889  0.065736  0.085348  0.838881  0.148148
1.711111  0.066173  0.086813  0.976818  0.148148
1.733333  0.066612  0.088289  1.115035  0.148148
1.755556  0.067052  0.089774  1.251329  0.148148
1.777778  0.067494  0.091269  1.383552  0.148148
1.800000  0.067938  0.092774  1.509672  0.148148
1.822222  0.068382  0.094288  1.627854  0.148148
1.844444  0.068829  0.095813  1.736538  0.148148
1.866667  0.069276  0.097347  1.834531  0.148148
1.888889  0.069725  0.098892  1.921105  0.148148
1.911111  0.070176  0.100446  1.996100  0.148148
1.933333  0.070628  0.102011  2.060036  0.148148
1.955556  0.071081  0.103585  2.114227  0.148148
1.977778  0.071536  0.105170  2.160903  0.148148
2.000000  0.071993  0.106765  2.203335  0.148148
END FTABLE  3
FTABLE      1
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.009780  0.000000  0.000000  0.000000
0.011111  0.009780  0.000109  0.000000  0.019941
```

0.022222	0.009780	0.000217	0.000000	0.020160
0.033333	0.009780	0.000326	0.000000	0.020380
0.044444	0.009780	0.000435	0.000000	0.020599
0.055556	0.009780	0.000543	0.000000	0.020818
0.066667	0.009780	0.000652	0.000000	0.021037
0.077778	0.009780	0.000761	0.000000	0.021256
0.088889	0.009780	0.000869	0.000000	0.021475
0.100000	0.009780	0.000978	0.000000	0.021694
0.111111	0.009780	0.001087	0.000000	0.021914
0.122222	0.009780	0.001195	0.000000	0.022133
0.133333	0.009780	0.001304	0.000000	0.022352
0.144444	0.009780	0.001413	0.000000	0.022571
0.155556	0.009780	0.001521	0.000000	0.022790
0.166667	0.009780	0.001630	0.000000	0.023009
0.177778	0.009780	0.001739	0.000000	0.023228
0.188889	0.009780	0.001847	0.000000	0.023448
0.200000	0.009780	0.001956	0.000000	0.023667
0.211111	0.009780	0.002065	0.000000	0.023886
0.222222	0.009780	0.002173	0.000000	0.024105
0.233333	0.009780	0.002282	0.000000	0.024324
0.244444	0.009780	0.002391	0.000000	0.024543
0.255556	0.009780	0.002499	0.000000	0.024762
0.266667	0.009780	0.002608	0.000000	0.024981
0.277778	0.009780	0.002717	0.000000	0.025201
0.288889	0.009780	0.002825	0.000000	0.025420
0.300000	0.009780	0.002934	0.000000	0.025639
0.311111	0.009780	0.003043	0.000000	0.025858
0.322222	0.009780	0.003151	0.000000	0.026077
0.333333	0.009780	0.003260	0.000000	0.026296
0.344444	0.009780	0.003369	0.000000	0.026515
0.355556	0.009780	0.003477	0.000000	0.026735
0.366667	0.009780	0.003586	0.000000	0.026954
0.377778	0.009780	0.003695	0.000000	0.027173
0.388889	0.009780	0.003803	0.000000	0.027392
0.400000	0.009780	0.003912	0.000000	0.027611
0.411111	0.009780	0.004021	0.000000	0.027830
0.422222	0.009780	0.004129	0.000000	0.028049
0.433333	0.009780	0.004238	0.000000	0.028269
0.444444	0.009780	0.004346	0.000000	0.028488
0.455556	0.009780	0.004455	0.000000	0.028707
0.466667	0.009780	0.004564	0.000000	0.028926
0.477778	0.009780	0.004672	0.000000	0.029145
0.488889	0.009780	0.004781	0.000000	0.029364
0.500000	0.009780	0.004890	0.000000	0.029583
0.511111	0.009780	0.004998	0.000000	0.029802
0.522222	0.009780	0.005107	0.000000	0.030022
0.533333	0.009780	0.005216	0.000000	0.030241
0.544444	0.009780	0.005324	0.000000	0.030460
0.555556	0.009780	0.005433	0.000000	0.030679
0.566667	0.009780	0.005542	0.000000	0.030898
0.577778	0.009780	0.005650	0.000000	0.031117
0.588889	0.009780	0.005759	0.000000	0.031336
0.600000	0.009780	0.005868	0.000000	0.031556
0.611111	0.009780	0.005976	0.000000	0.031775
0.622222	0.009780	0.006085	0.000000	0.031994
0.633333	0.009780	0.006194	0.000000	0.032213
0.644444	0.009780	0.006302	0.000000	0.032432
0.655556	0.009780	0.006411	0.000000	0.032651
0.666667	0.009780	0.006520	0.000000	0.032870
0.677778	0.009780	0.006628	0.000000	0.033090
0.688889	0.009780	0.006737	0.000000	0.033309
0.700000	0.009780	0.006846	0.000000	0.033528
0.711111	0.009780	0.006954	0.024873	0.033747
0.722222	0.009780	0.007063	0.070329	0.033966
0.733333	0.009780	0.007172	0.129168	0.034185
0.744444	0.009780	0.007280	0.198819	0.034404
0.755556	0.009780	0.007389	0.277796	0.034623
0.766667	0.009780	0.007498	0.365093	0.034843
0.777778	0.009780	0.007606	0.459969	0.035062
0.788889	0.009780	0.007715	0.561842	0.035281

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0.800000  0.009780  0.007824  0.670242  0.035500
0.811111  0.009780  0.007932  0.784769  0.035719
0.822222  0.009780  0.008041  0.905080  0.035938
0.833333  0.009780  0.008150  1.030872  0.036157
0.844444  0.009780  0.008258  1.161868  0.036377
0.855556  0.009780  0.008367  1.297820  0.036596
0.866667  0.009780  0.008476  1.438492  0.036815
0.877778  0.009780  0.008584  1.583664  0.037034
0.888889  0.009780  0.008693  1.733126  0.037253
0.900000  0.009780  0.008802  1.886677  0.037472
0.911111  0.009780  0.008910  2.044119  0.037691
0.922222  0.009780  0.009019  2.205262  0.037910
0.933333  0.009780  0.009128  2.369915  0.038130
0.944444  0.009780  0.009236  2.537894  0.038349
0.955556  0.009780  0.009345  2.709012  0.038568
0.966667  0.009780  0.009454  2.883085  0.038787
0.977778  0.009780  0.009562  3.059929  0.039006
0.988889  0.009780  0.009671  3.239358  0.039225
1.000000  0.009780  0.009780  3.421187  0.039444
END FTABLE  1
FTABLE      2
 91    4
   Depth      Area    Volume  Outflow1 Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
0.000000  0.000000  0.000000  0.000000
0.031111  0.000067  0.000001  0.019146
0.062222  0.000095  0.000004  0.027076
0.093333  0.000115  0.000007  0.033162
0.124444  0.000132  0.000011  0.038292
0.155556  0.000147  0.000015  0.042812
0.186667  0.000160  0.000020  0.046898
0.217778  0.000172  0.000025  0.050655
0.248889  0.000183  0.000031  0.054153
0.280000  0.000193  0.000037  0.057438
0.311111  0.000202  0.000043  0.060545
0.342222  0.000211  0.000049  0.063500
0.373333  0.000219  0.000056  0.066323
0.404444  0.000226  0.000063  0.069032
0.435556  0.000233  0.000070  0.071638
0.466667  0.000240  0.000077  0.074152
0.497778  0.000246  0.000085  0.076584
0.528889  0.000252  0.000093  0.078941
0.560000  0.000257  0.000101  0.081229
0.591111  0.000262  0.000109  0.083455
0.622222  0.000267  0.000117  0.085623
0.653333  0.000272  0.000125  0.087738
0.684444  0.000276  0.000134  0.089802
0.715556  0.000280  0.000143  0.091821
0.746667  0.000284  0.000151  0.093796
0.777778  0.000288  0.000160  0.095730
0.808889  0.000291  0.000169  0.097625
0.840000  0.000295  0.000178  0.099485
0.871111  0.000298  0.000188  0.101311
0.902222  0.000300  0.000197  0.103104
0.933333  0.000303  0.000206  0.104867
0.964444  0.000305  0.000216  0.106600
0.995556  0.000308  0.000225  0.108306
1.026667  0.000310  0.000235  0.137681
1.057778  0.000312  0.000245  0.152407
1.088889  0.000313  0.000254  0.163835
1.120000  0.000315  0.000264  0.173628
1.151111  0.000316  0.000274  0.182391
1.182222  0.000317  0.000284  0.190424
1.213333  0.000319  0.000294  0.197904
1.244444  0.000319  0.000304  0.204944
1.275556  0.000320  0.000313  0.211625
1.306667  0.000321  0.000323  0.218003
1.337778  0.000321  0.000333  0.224120
1.368889  0.000321  0.000343  0.230011
1.400000  0.000321  0.000353  0.235702
```

```
  1.431111  0.000321  0.000363  0.241215
  1.462222  0.000321  0.000373  0.246567
  1.493333  0.000321  0.000383  0.251774
  1.524444  0.000320  0.000393  0.256847
  1.555556  0.000319  0.000403  0.261798
  1.586667  0.000319  0.000413  0.266637
  1.617778  0.000317  0.000423  0.271371
  1.648889  0.000316  0.000433  0.276008
  1.680000  0.000315  0.000443  0.280553
  1.711111  0.000313  0.000453  0.285014
  1.742222  0.000312  0.000462  0.289394
  1.773333  0.000310  0.000472  0.293698
  1.804444  0.000308  0.000482  0.297931
  1.835556  0.000305  0.000491  0.302096
  1.866667  0.000303  0.000501  0.306197
  1.897778  0.000300  0.000510  0.310237
  1.928889  0.000298  0.000519  0.314219
  1.960000  0.000295  0.000528  0.318144
  1.991111  0.000291  0.000538  0.322017
  2.022222  0.000288  0.000547  0.362246
  2.053333  0.000284  0.000555  0.386014
  2.084444  0.000280  0.000564  0.404309
  2.115556  0.000276  0.000573  0.420041
  2.146667  0.000272  0.000581  0.434189
  2.177778  0.000267  0.000590  0.447228
  2.208889  0.000262  0.000598  0.459431
  2.240000  0.000257  0.000606  0.470971
  2.271111  0.000252  0.000614  0.481969
  2.302222  0.000246  0.000622  0.492510
  2.333333  0.000240  0.000629  0.502659
  2.364444  0.000233  0.000637  0.512466
  2.395556  0.000226  0.000644  0.521970
  2.426667  0.000219  0.000651  0.531205
  2.457778  0.000211  0.000657  0.540196
  2.488889  0.000202  0.000664  0.548966
  2.520000  0.000193  0.000670  0.557534
  2.551111  0.000183  0.000676  0.565916
  2.582222  0.000172  0.000681  0.574125
  2.613333  0.000160  0.000687  0.582174
  2.644444  0.000147  0.000691  0.590074
  2.675556  0.000132  0.000696  0.597833
  2.706667  0.000115  0.000700  0.605462
  2.737778  0.000095  0.000703  0.612966
  2.768889  0.000067  0.000705  0.620354
  2.800000  0.001000  0.000707  0.627630
  END FTABLE  2
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.167          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO     1 1        1      WDM   1006 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1007 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1008 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1009 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
```

```
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK         2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     2

  MASS-LINK         3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     3

  MASS-LINK         5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK     5

  MASS-LINK         6
RCHRES     ROFLOW                          RCHRES         INFLOW
  END MASS-LINK     6

  MASS-LINK         7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK     7

  MASS-LINK         8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK     8

  MASS-LINK        16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK    16

  MASS-LINK        17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK    17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Black Diamond Sand Filter 4H 1-10-24
Site Name:	Rainier View Project
Site Address:	1st Street
City:	Black Diamond
Report Date:	2/2/2003
Gage:	Seatac
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.17
Version Date:	2015/11/13
Version:	4.2.11

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
SAT, Forest, Flat	0.317
Pervious Total	0.317
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.317

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.135
Pervious Total	0.135

Impervious Land Use	acre
ROOF TOPS FLAT	0.163
DRIVEWAYS FLAT	0.019
Impervious Total	0.182
Basin Total	0.317

Element Flows To:

Surface	Interflow	Groundwater
Sand Filter 1	Sand Filter 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Tank 1

Dimensions
Depth: 3 ft.
Tank Type: Circular
Diameter: 3 ft.
Length: 5 ft.
Discharge Structure
Riser Height: 2 ft.
Riser Diameter: 12 in.
Notch Type: Rectangular
Notch Width: 0.000 ft.
Notch Height: 0.000 ft.
Orifice 1 Diameter: 0.5 in. Elevation:0 ft.
Orifice 2 Diameter: 1.5 in. Elevation:0.5 ft.
Orifice 3 Diameter: 2 in. Elevation:1 ft.
Element Flows To:
Outlet 1 Outlet 2
Trapezoidal Pond 1

Tank Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000	0.000	0.000	0.000
0.0333	0.000	0.000	0.001	0.000
0.0667	0.000	0.000	0.001	0.000
0.1000	0.000	0.000	0.002	0.000
0.1333	0.000	0.000	0.002	0.000
0.1667	0.000	0.000	0.002	0.000
0.2000	0.000	0.000	0.003	0.000
0.2333	0.000	0.000	0.003	0.000
0.2667	0.000	0.000	0.003	0.000
0.3000	0.000	0.000	0.003	0.000
0.3333	0.000	0.000	0.003	0.000
0.3667	0.000	0.000	0.004	0.000
0.4000	0.000	0.000	0.004	0.000
0.4333	0.000	0.000	0.004	0.000
0.4667	0.000	0.000	0.004	0.000
0.5000	0.000	0.000	0.004	0.000
0.5333	0.000	0.000	0.016	0.000
0.5667	0.000	0.000	0.020	0.000
0.6000	0.000	0.000	0.024	0.000
0.6333	0.000	0.000	0.027	0.000
0.6667	0.000	0.000	0.030	0.000
0.7000	0.000	0.000	0.033	0.000
0.7333	0.000	0.000	0.035	0.000
0.7667	0.000	0.000	0.037	0.000
0.8000	0.000	0.000	0.039	0.000
0.8333	0.000	0.000	0.041	0.000
0.8667	0.000	0.000	0.043	0.000
0.9000	0.000	0.000	0.045	0.000
0.9333	0.000	0.000	0.046	0.000
0.9667	0.000	0.000	0.048	0.000
1.0000	0.000	0.000	0.050	0.000
1.0333	0.000	0.000	0.071	0.000
1.0667	0.000	0.000	0.081	0.000

1.1000	0.000	0.000	0.088	0.000
1.1333	0.000	0.000	0.095	0.000
1.1667	0.000	0.000	0.101	0.000
1.2000	0.000	0.000	0.107	0.000
1.2333	0.000	0.000	0.112	0.000
1.2667	0.000	0.000	0.117	0.000
1.3000	0.000	0.000	0.121	0.000
1.3333	0.000	0.000	0.126	0.000
1.3667	0.000	0.000	0.130	0.000
1.4000	0.000	0.000	0.134	0.000
1.4333	0.000	0.000	0.138	0.000
1.4667	0.000	0.000	0.142	0.000
1.5000	0.000	0.000	0.146	0.000
1.5333	0.000	0.000	0.149	0.000
1.5667	0.000	0.000	0.153	0.000
1.6000	0.000	0.000	0.156	0.000
1.6333	0.000	0.000	0.160	0.000
1.6667	0.000	0.000	0.163	0.000
1.7000	0.000	0.000	0.166	0.000
1.7333	0.000	0.000	0.169	0.000
1.7667	0.000	0.000	0.172	0.000
1.8000	0.000	0.000	0.175	0.000
1.8333	0.000	0.000	0.178	0.000
1.8667	0.000	0.000	0.181	0.000
1.9000	0.000	0.000	0.184	0.000
1.9333	0.000	0.000	0.187	0.000
1.9667	0.000	0.000	0.190	0.000
2.0000	0.000	0.000	0.192	0.000
2.0333	0.000	0.000	0.260	0.000
2.0667	0.000	0.000	0.380	0.000
2.1000	0.000	0.000	0.534	0.000
2.1333	0.000	0.000	0.713	0.000
2.1667	0.000	0.000	0.909	0.000
2.2000	0.000	0.000	1.116	0.000
2.2333	0.000	0.000	1.326	0.000
2.2667	0.000	0.000	1.531	0.000
2.3000	0.000	0.000	1.725	0.000
2.3333	0.000	0.000	1.901	0.000
2.3667	0.000	0.000	2.055	0.000
2.4000	0.000	0.000	2.183	0.000
2.4333	0.000	0.000	2.285	0.000
2.4667	0.000	0.000	2.366	0.000
2.5000	0.000	0.000	2.457	0.000
2.5333	0.000	0.000	2.532	0.000
2.5667	0.000	0.000	2.605	0.000
2.6000	0.000	0.000	2.676	0.000
2.6333	0.000	0.000	2.745	0.000
2.6667	0.000	0.000	2.812	0.000
2.7000	0.000	0.000	2.878	0.000
2.7333	0.000	0.000	2.942	0.000
2.7667	0.000	0.000	3.005	0.000
2.8000	0.000	0.000	3.066	0.000
2.8333	0.000	0.000	3.126	0.000
2.8667	0.000	0.000	3.185	0.000
2.9000	0.000	0.000	3.243	0.000
2.9333	0.000	0.000	3.300	0.000
2.9667	0.000	0.000	3.356	0.000
3.0000	0.000	0.000	3.411	0.000

3.0333	0.000	0.000	3.465	0.000

Trapezoidal Pond 1

Bottom Length:	40.00 ft.
Bottom Width:	40.00 ft.
Depth:	3 ft.
Volume at riser head:	0.1454 acre-feet.
Infiltration On	
Infiltration rate:	4
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft.):	48.316
Total Volume Through Riser (ac-ft.):	0
Total Volume Through Facility (ac-ft.):	48.316
Percent Infiltrated:	100
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Side slope 1:	4 To 1
Side slope 2:	4 To 1
Side slope 3:	4 To 1
Side slope 4:	4 To 1
Discharge Structure	
Riser Height:	2.5 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2

Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.036	0.000	0.000	0.000
0.0333	0.037	0.001	0.000	0.148
0.0667	0.037	0.002	0.000	0.148
0.1000	0.038	0.003	0.000	0.148
0.1333	0.038	0.005	0.000	0.148
0.1667	0.039	0.006	0.000	0.148
0.2000	0.039	0.007	0.000	0.148
0.2333	0.040	0.009	0.000	0.148
0.2667	0.040	0.010	0.000	0.148
0.3000	0.041	0.011	0.000	0.148
0.3333	0.041	0.013	0.000	0.148
0.3667	0.042	0.014	0.000	0.148
0.4000	0.042	0.015	0.000	0.148
0.4333	0.043	0.017	0.000	0.148
0.4667	0.043	0.018	0.000	0.148
0.5000	0.044	0.020	0.000	0.148
0.5333	0.045	0.021	0.000	0.148
0.5667	0.045	0.023	0.000	0.148
0.6000	0.046	0.024	0.000	0.148
0.6333	0.046	0.026	0.000	0.148
0.6667	0.047	0.027	0.000	0.148
0.7000	0.047	0.029	0.000	0.148
0.7333	0.048	0.031	0.000	0.148
0.7667	0.048	0.032	0.000	0.148
0.8000	0.049	0.034	0.000	0.148
0.8333	0.050	0.036	0.000	0.148
0.8667	0.050	0.037	0.000	0.148
0.9000	0.051	0.039	0.000	0.148
0.9333	0.051	0.041	0.000	0.148

0.9667	0.052	0.042	0.000	0.148
1.0000	0.052	0.044	0.000	0.148
1.0333	0.053	0.046	0.000	0.148
1.0667	0.054	0.048	0.000	0.148
1.1000	0.054	0.049	0.000	0.148
1.1333	0.055	0.051	0.000	0.148
1.1667	0.055	0.053	0.000	0.148
1.2000	0.056	0.055	0.000	0.148
1.2333	0.057	0.057	0.000	0.148
1.2667	0.057	0.059	0.000	0.148
1.3000	0.058	0.061	0.000	0.148
1.3333	0.058	0.063	0.000	0.148
1.3667	0.059	0.065	0.000	0.148
1.4000	0.060	0.067	0.000	0.148
1.4333	0.060	0.069	0.000	0.148
1.4667	0.061	0.071	0.000	0.148
1.5000	0.062	0.073	0.000	0.148
1.5333	0.062	0.075	0.000	0.148
1.5667	0.063	0.077	0.000	0.148
1.6000	0.064	0.079	0.000	0.148
1.6333	0.064	0.081	0.000	0.148
1.6667	0.065	0.083	0.000	0.148
1.7000	0.066	0.086	0.000	0.148
1.7333	0.066	0.088	0.000	0.148
1.7667	0.067	0.090	0.000	0.148
1.8000	0.067	0.092	0.000	0.148
1.8333	0.068	0.095	0.000	0.148
1.8667	0.069	0.097	0.000	0.148
1.9000	0.070	0.099	0.000	0.148
1.9333	0.070	0.102	0.000	0.148
1.9667	0.071	0.104	0.000	0.148
2.0000	0.072	0.106	0.000	0.148
2.0333	0.072	0.109	0.000	0.148
2.0667	0.073	0.111	0.000	0.148
2.1000	0.074	0.114	0.000	0.148
2.1333	0.074	0.116	0.000	0.148
2.1667	0.075	0.119	0.000	0.148
2.2000	0.076	0.121	0.000	0.148
2.2333	0.076	0.124	0.000	0.148
2.2667	0.077	0.126	0.000	0.148
2.3000	0.078	0.129	0.000	0.148
2.3333	0.079	0.131	0.000	0.148
2.3667	0.079	0.134	0.000	0.148
2.4000	0.080	0.137	0.000	0.148
2.4333	0.081	0.139	0.000	0.148
2.4667	0.081	0.142	0.000	0.148
2.5000	0.082	0.145	0.000	0.148
2.5333	0.083	0.148	0.064	0.148
2.5667	0.084	0.151	0.182	0.148
2.6000	0.084	0.153	0.333	0.148
2.6333	0.085	0.156	0.509	0.148
2.6667	0.086	0.159	0.703	0.148
2.7000	0.087	0.162	0.907	0.148
2.7333	0.087	0.165	1.115	0.148
2.7667	0.088	0.168	1.318	0.148
2.8000	0.089	0.171	1.509	0.148
2.8333	0.090	0.174	1.683	0.148
2.8667	0.090	0.177	1.834	0.148

2.9000	0.091	0.180	1.960	0.148
2.9333	0.092	0.183	2.060	0.148
2.9667	0.093	0.186	2.138	0.148
3.0000	0.094	0.189	2.203	0.148
3.0333	0.094	0.192	2.300	0.148

Sand Filter 1

Bottom Length:	207.00 ft.
Bottom Width:	2.00 ft.
Depth:	0.5 ft.
Side slope 1:	0 To 1
Side slope 2:	0 To 1
Side slope 3:	0 To 1
Side slope 4:	0 To 1
Filtration On	
Hydraulic conductivity:	2
Depth of filter medium:	1
Total Volume Infiltrated (ac-ft.):	47.351
Total Volume Through Riser (ac-ft.):	0.964
Total Volume Through Facility (ac-ft.):	48.315
Percent Infiltrated:	98
Total Precip Applied to Facility:	0
Total Evap From Facility:	0
Discharge Structure	
Riser Height:	0.4 ft.
Riser Diameter:	24 in.
Element Flows To:	
Outlet 1	Outlet 2
Tank 1	Tank 1

Sand Filter Hydraulic Table

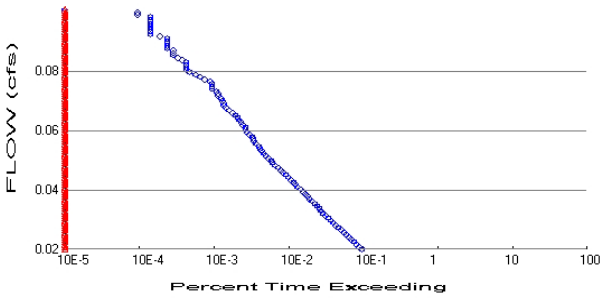
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.009	0.000	0.000	0.000
0.0056	0.009	0.000	0.000	0.019
0.0111	0.009	0.000	0.000	0.019
0.0167	0.009	0.000	0.000	0.019
0.0222	0.009	0.000	0.000	0.019
0.0278	0.009	0.000	0.000	0.019
0.0333	0.009	0.000	0.000	0.019
0.0389	0.009	0.000	0.000	0.019
0.0444	0.009	0.000	0.000	0.020
0.0500	0.009	0.000	0.000	0.020
0.0556	0.009	0.000	0.000	0.020
0.0611	0.009	0.000	0.000	0.020
0.0667	0.009	0.000	0.000	0.020
0.0722	0.009	0.000	0.000	0.020
0.0778	0.009	0.000	0.000	0.020
0.0833	0.009	0.000	0.000	0.020
0.0889	0.009	0.000	0.000	0.020
0.0944	0.009	0.000	0.000	0.021
0.1000	0.009	0.001	0.000	0.021
0.1056	0.009	0.001	0.000	0.021
0.1111	0.009	0.001	0.000	0.021
0.1167	0.009	0.001	0.000	0.021
0.1222	0.009	0.001	0.000	0.021
0.1278	0.009	0.001	0.000	0.021
0.1333	0.009	0.001	0.000	0.021
0.1389	0.009	0.001	0.000	0.021
0.1444	0.009	0.001	0.000	0.021
0.1500	0.009	0.001	0.000	0.022
0.1556	0.009	0.001	0.000	0.022
0.1611	0.009	0.001	0.000	0.022

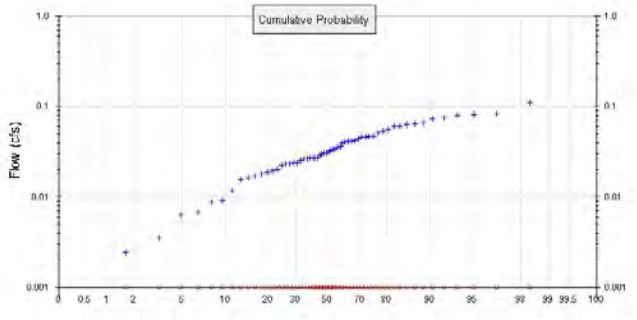
0.1667	0.009	0.001	0.000	0.022
0.1722	0.009	0.001	0.000	0.022
0.1778	0.009	0.001	0.000	0.022
0.1833	0.009	0.001	0.000	0.022
0.1889	0.009	0.001	0.000	0.022
0.1944	0.009	0.001	0.000	0.022
0.2000	0.009	0.001	0.000	0.023
0.2056	0.009	0.002	0.000	0.023
0.2111	0.009	0.002	0.000	0.023
0.2167	0.009	0.002	0.000	0.023
0.2222	0.009	0.002	0.000	0.023
0.2278	0.009	0.002	0.000	0.023
0.2333	0.009	0.002	0.000	0.023
0.2389	0.009	0.002	0.000	0.023
0.2444	0.009	0.002	0.000	0.023
0.2500	0.009	0.002	0.000	0.024
0.2556	0.009	0.002	0.000	0.024
0.2611	0.009	0.002	0.000	0.024
0.2667	0.009	0.002	0.000	0.024
0.2722	0.009	0.002	0.000	0.024
0.2778	0.009	0.002	0.000	0.024
0.2833	0.009	0.002	0.000	0.024
0.2889	0.009	0.002	0.000	0.024
0.2944	0.009	0.002	0.000	0.024
0.3000	0.009	0.002	0.000	0.024
0.3056	0.009	0.002	0.000	0.025
0.3111	0.009	0.003	0.000	0.025
0.3167	0.009	0.003	0.000	0.025
0.3222	0.009	0.003	0.000	0.025
0.3278	0.009	0.003	0.000	0.025
0.3333	0.009	0.003	0.000	0.025
0.3389	0.009	0.003	0.000	0.025
0.3444	0.009	0.003	0.000	0.025
0.3500	0.009	0.003	0.000	0.025
0.3556	0.009	0.003	0.000	0.026
0.3611	0.009	0.003	0.000	0.026
0.3667	0.009	0.003	0.000	0.026
0.3722	0.009	0.003	0.000	0.026
0.3778	0.009	0.003	0.000	0.026
0.3833	0.009	0.003	0.000	0.026
0.3889	0.009	0.003	0.000	0.026
0.3944	0.009	0.003	0.000	0.026
0.4000	0.009	0.003	0.000	0.026
0.4056	0.009	0.003	0.008	0.026
0.4111	0.009	0.003	0.024	0.027
0.4167	0.009	0.004	0.045	0.027
0.4222	0.009	0.004	0.070	0.027
0.4278	0.009	0.004	0.098	0.027
0.4333	0.009	0.004	0.129	0.027
0.4389	0.009	0.004	0.162	0.027
0.4444	0.009	0.004	0.198	0.027
0.4500	0.009	0.004	0.237	0.027
0.4556	0.009	0.004	0.277	0.027
0.4611	0.009	0.004	0.320	0.028
0.4667	0.009	0.004	0.365	0.028
0.4722	0.009	0.004	0.411	0.028
0.4778	0.009	0.004	0.460	0.028
0.4833	0.009	0.004	0.510	0.028

0.4889	0.009	0.004	0.561	0.028
0.4944	0.009	0.004	0.615	0.028
0.5000	0.009	0.004	0.670	0.028
0.5056	0.009	0.004	0.726	0.028

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.317
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.135
Total Impervious Area: 0.182

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.032399
5 year	0.056676
10 year	0.070939
25 year	0.086105
50 year	0.095399
100 year	0.103188

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.035	0.000
1950	0.073	0.000
1951	0.061	0.000
1952	0.023	0.000
1953	0.016	0.000
1954	0.027	0.000
1955	0.056	0.000
1956	0.046	0.000
1957	0.039	0.000
1958	0.027	0.000

1959	0.024	0.000
1960	0.047	0.000
1961	0.041	0.000
1962	0.006	0.000
1963	0.030	0.000
1964	0.033	0.000
1965	0.046	0.000
1966	0.029	0.000
1967	0.081	0.000
1968	0.022	0.000
1969	0.042	0.000
1970	0.027	0.000
1971	0.023	0.000
1972	0.074	0.000
1973	0.026	0.000
1974	0.020	0.000
1975	0.037	0.000
1976	0.027	0.000
1977	0.007	0.000
1978	0.017	0.000
1979	0.018	0.000
1980	0.009	0.000
1981	0.027	0.000
1982	0.067	0.000
1983	0.019	0.000
1984	0.032	0.000
1985	0.016	0.000
1986	0.034	0.000
1987	0.033	0.000
1988	0.002	0.000
1989	0.009	0.000
1990	0.083	0.000
1991	0.060	0.000
1992	0.020	0.000
1993	0.012	0.000
1994	0.002	0.000
1995	0.030	0.000
1996	0.064	0.000
1997	0.053	0.000
1998	0.023	0.000
1999	0.051	0.000
2000	0.042	0.000
2001	0.003	0.000
2002	0.044	0.000
2003	0.025	0.000
2004	0.030	0.000
2005	0.041	0.000
2006	0.046	0.000
2007	0.080	0.000
2008	0.111	0.000
2009	0.064	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1110	0.0000
2	0.0832	0.0000
3	0.0809	0.0000

4	0.0799	0.0000
5	0.0743	0.0000
6	0.0729	0.0000
7	0.0666	0.0000
8	0.0641	0.0000
9	0.0639	0.0000
10	0.0611	0.0000
11	0.0601	0.0000
12	0.0558	0.0000
13	0.0532	0.0000
14	0.0509	0.0000
15	0.0468	0.0000
16	0.0465	0.0000
17	0.0464	0.0000
18	0.0462	0.0000
19	0.0438	0.0000
20	0.0422	0.0000
21	0.0416	0.0000
22	0.0413	0.0000
23	0.0407	0.0000
24	0.0393	0.0000
25	0.0365	0.0000
26	0.0348	0.0000
27	0.0343	0.0000
28	0.0335	0.0000
29	0.0327	0.0000
30	0.0321	0.0000
31	0.0305	0.0000
32	0.0305	0.0000
33	0.0299	0.0000
34	0.0287	0.0000
35	0.0273	0.0000
36	0.0273	0.0000
37	0.0270	0.0000
38	0.0268	0.0000
39	0.0267	0.0000
40	0.0262	0.0000
41	0.0254	0.0000
42	0.0239	0.0000
43	0.0235	0.0000
44	0.0234	0.0000
45	0.0230	0.0000
46	0.0221	0.0000
47	0.0199	0.0000
48	0.0196	0.0000
49	0.0186	0.0000
50	0.0181	0.0000
51	0.0167	0.0000
52	0.0163	0.0000
53	0.0156	0.0000
54	0.0118	0.0000
55	0.0091	0.0000
56	0.0088	0.0000
57	0.0067	0.0000
58	0.0064	0.0000
59	0.0035	0.0000
60	0.0024	0.0000
61	0.0024	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0162	2050	0	0	Pass
0.0170	1878	0	0	Pass
0.0178	1725	0	0	Pass
0.0186	1597	0	0	Pass
0.0194	1480	0	0	Pass
0.0202	1365	0	0	Pass
0.0210	1257	0	0	Pass
0.0218	1176	0	0	Pass
0.0226	1085	0	0	Pass
0.0234	990	0	0	Pass
0.0242	916	0	0	Pass
0.0250	844	0	0	Pass
0.0258	782	0	0	Pass
0.0266	728	0	0	Pass
0.0274	666	0	0	Pass
0.0282	611	0	0	Pass
0.0290	579	0	0	Pass
0.0298	551	0	0	Pass
0.0306	511	0	0	Pass
0.0314	478	0	0	Pass
0.0322	438	0	0	Pass
0.0330	405	0	0	Pass
0.0338	381	0	0	Pass
0.0346	357	0	0	Pass
0.0354	336	0	0	Pass
0.0362	311	0	0	Pass
0.0370	283	0	0	Pass
0.0378	263	0	0	Pass
0.0386	248	0	0	Pass
0.0394	226	0	0	Pass
0.0402	214	0	0	Pass
0.0410	195	0	0	Pass
0.0418	177	0	0	Pass
0.0426	167	0	0	Pass
0.0434	156	0	0	Pass
0.0442	141	0	0	Pass
0.0450	129	0	0	Pass
0.0458	124	0	0	Pass
0.0466	114	0	0	Pass
0.0474	105	0	0	Pass
0.0482	99	0	0	Pass
0.0490	93	0	0	Pass
0.0498	88	0	0	Pass
0.0506	85	0	0	Pass
0.0514	79	0	0	Pass
0.0522	73	0	0	Pass
0.0530	72	0	0	Pass
0.0538	69	0	0	Pass
0.0546	64	0	0	Pass
0.0554	58	0	0	Pass
0.0562	56	0	0	Pass
0.0570	56	0	0	Pass
0.0578	52	0	0	Pass

0.0586	49	0	0	Pass
0.0594	47	0	0	Pass
0.0602	44	0	0	Pass
0.0610	41	0	0	Pass
0.0618	38	0	0	Pass
0.0626	34	0	0	Pass
0.0634	31	0	0	Pass
0.0642	29	0	0	Pass
0.0650	29	0	0	Pass
0.0658	28	0	0	Pass
0.0666	27	0	0	Pass
0.0674	24	0	0	Pass
0.0682	24	0	0	Pass
0.0690	23	0	0	Pass
0.0698	20	0	0	Pass
0.0706	20	0	0	Pass
0.0714	20	0	0	Pass
0.0722	19	0	0	Pass
0.0730	16	0	0	Pass
0.0738	14	0	0	Pass
0.0746	12	0	0	Pass
0.0754	10	0	0	Pass
0.0762	9	0	0	Pass
0.0770	9	0	0	Pass
0.0778	9	0	0	Pass
0.0786	9	0	0	Pass
0.0794	8	0	0	Pass
0.0802	7	0	0	Pass
0.0810	6	0	0	Pass
0.0818	6	0	0	Pass
0.0826	6	0	0	Pass
0.0834	5	0	0	Pass
0.0842	5	0	0	Pass
0.0850	5	0	0	Pass
0.0858	5	0	0	Pass
0.0866	5	0	0	Pass
0.0874	4	0	0	Pass
0.0882	3	0	0	Pass
0.0890	3	0	0	Pass
0.0898	3	0	0	Pass
0.0906	3	0	0	Pass
0.0914	3	0	0	Pass
0.0922	3	0	0	Pass
0.0930	3	0	0	Pass
0.0938	3	0	0	Pass
0.0946	2	0	0	Pass
0.0954	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	43.97			☐	100.00			
Tank 1	☐	43.97			☐	0.00			
Sand Filter 1	☐	44.20			☐	0.00			
Total Volume Infiltrated		132.13	0.00	0.00		33.28	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

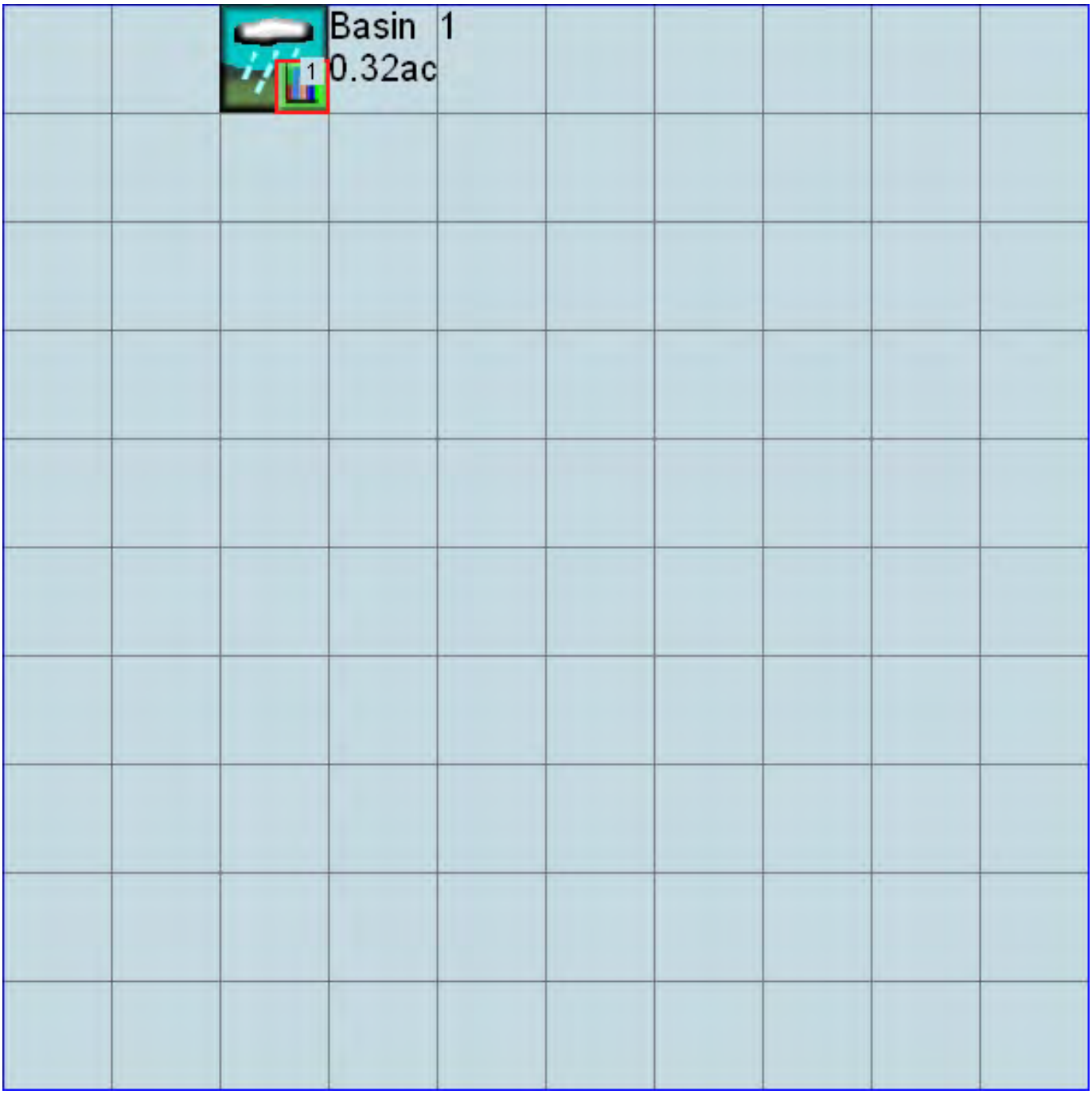
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Black Diamond Sand Filter 4H 1-10-24.wdm
MESSU       25   PreBlack Diamond Sand Filter 4H 1-10-24.MES
            27   PreBlack Diamond Sand Filter 4H 1-10-24.L61
            28   PreBlack Diamond Sand Filter 4H 1-10-24.L62
            30   POCBlack Diamond Sand Filter 4H 1-10-241.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      19
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   19     SAT, Forest, Flat       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   19         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   19         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   19         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   19              0         4         2       100     0.001       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   19             0         0        10         2         0         0       0.7
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   19           0.2         3       0.5         1       0.7       0.8
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   19             0         0         0         0       4.2         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  19                       0.317     COPY   501     12
PERLND  19                       0.317     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.167          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Black Diamond Sand Filter 4H 1-10-24.wdm
MESSU       25   MitBlack Diamond Sand Filter 4H 1-10-24.MES
            27   MitBlack Diamond Sand Filter 4H 1-10-24.L61
            28   MitBlack Diamond Sand Filter 4H 1-10-24.L62
            30   POCBlack Diamond Sand Filter 4H 1-10-241.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      16
      IMPLND       4
      IMPLND       5
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   16              0         0         0         0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
    5      DRIVEWAYS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    4         0    0    0    0    0
    5         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
```

```
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    4              0         0
    5              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4              0         0
    5              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  16                       0.135     RCHRES   1      2
PERLND  16                       0.135     RCHRES   1      3
IMPLND   4                       0.163     RCHRES   1      5
IMPLND   5                       0.019     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      6
RCHRES   2                                 COPY     1     16
RCHRES   1                           1     RCHRES   2      7
RCHRES   1                           1     RCHRES   2      8
RCHRES   3                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                        in  out                             ***
    1     Sand Filter  1          2    1    1    1   28    0    1
    2     Tank  1                 1    1    1    1   28    0    1
    3     Trapezoidal Pond-009    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1        4    0    0    0    0    0    0    0    0    0    1    9
    2        4    0    0    0    0    0    0    0    0    0    1    9
    3        4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                         ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50        ***
  <------><--------><--------><--------><--------><--------><-------->        ***
    1             1      0.04       0.0       0.0       0.5       0.0
    2             2      0.01       0.0       0.0       0.5       0.0
    3             3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                            ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.000000  0.000000  0.000000
  0.033333  0.000072  0.000002  0.001239
  0.066667  0.000102  0.000005  0.001752
  0.100000  0.000124  0.000008  0.002145
  0.133333  0.000142  0.000013  0.002477
  0.166667  0.000158  0.000018  0.002770
  0.200000  0.000172  0.000023  0.003034
  0.233333  0.000184  0.000029  0.003277
  0.266667  0.000196  0.000036  0.003503
  0.300000  0.000207  0.000042  0.003716
  0.333333  0.000216  0.000049  0.003917
  0.366667  0.000226  0.000057  0.004108
  0.400000  0.000234  0.000064  0.004291
  0.433333  0.000242  0.000072  0.004466
  0.466667  0.000250  0.000080  0.004634
  0.500000  0.000257  0.000089  0.004797
  0.533333  0.000263  0.000098  0.016102
  0.566667  0.000270  0.000106  0.020872
  0.600000  0.000275  0.000116  0.024563
  0.633333  0.000281  0.000125  0.027694
  0.666667  0.000286  0.000134  0.030466
  0.700000  0.000291  0.000144  0.032982
  0.733333  0.000296  0.000154  0.035303
  0.766667  0.000300  0.000164  0.037470
  0.800000  0.000305  0.000174  0.039511
  0.833333  0.000308  0.000184  0.041445
  0.866667  0.000312  0.000194  0.043288
  0.900000  0.000316  0.000205  0.045052
```

```
0.933333  0.000319  0.000215  0.046747
0.966667  0.000322  0.000226  0.048381
1.000000  0.000325  0.000237  0.049959
1.033333  0.000327  0.000248  0.071305
1.066667  0.000330  0.000259  0.080996
1.100000  0.000332  0.000270  0.088736
1.133333  0.000334  0.000281  0.095449
1.166667  0.000336  0.000292  0.101495
1.200000  0.000337  0.000303  0.107060
1.233333  0.000339  0.000314  0.112254
1.266667  0.000340  0.000326  0.117151
1.300000  0.000341  0.000337  0.121801
1.333333  0.000342  0.000348  0.126241
1.366667  0.000343  0.000360  0.130501
1.400000  0.000344  0.000371  0.134603
1.433333  0.000344  0.000383  0.138564
1.466667  0.000344  0.000394  0.142400
1.500000  0.000344  0.000406  0.146121
1.533333  0.000344  0.000417  0.149740
1.566667  0.000344  0.000429  0.153263
1.600000  0.000344  0.000440  0.156700
1.633333  0.000343  0.000452  0.160056
1.666667  0.000342  0.000463  0.163337
1.700000  0.000341  0.000474  0.166548
1.733333  0.000340  0.000486  0.169694
1.766667  0.000339  0.000497  0.172779
1.800000  0.000337  0.000508  0.175806
1.833333  0.000336  0.000520  0.178779
1.866667  0.000334  0.000531  0.181700
1.900000  0.000332  0.000542  0.184573
1.933333  0.000330  0.000553  0.187399
1.966667  0.000327  0.000564  0.190181
2.000000  0.000325  0.000575  0.192922
2.033333  0.000322  0.000585  0.260162
2.066667  0.000319  0.000596  0.380518
2.100000  0.000316  0.000607  0.534430
2.133333  0.000312  0.000617  0.713162
2.166667  0.000308  0.000627  0.909488
2.200000  0.000305  0.000638  1.116256
2.233333  0.000300  0.000648  1.326108
2.266667  0.000296  0.000658  1.531615
2.300000  0.000291  0.000667  1.725641
2.333333  0.000286  0.000677  1.901843
2.366667  0.000281  0.000687  2.055286
2.400000  0.000275  0.000696  2.183142
2.433333  0.000270  0.000705  2.285471
2.466667  0.000263  0.000714  2.366064
2.500000  0.000257  0.000722  2.457143
2.533333  0.000250  0.000731  2.532440
2.566667  0.000242  0.000739  2.605465
2.600000  0.000234  0.000747  2.676416
2.633333  0.000226  0.000755  2.745461
2.666667  0.000216  0.000762  2.812749
2.700000  0.000207  0.000769  2.878409
2.733333  0.000196  0.000776  2.942554
2.766667  0.000184  0.000782  3.005287
2.800000  0.000172  0.000788  3.066697
2.833333  0.000158  0.000794  3.126866
2.866667  0.000142  0.000799  3.185867
2.900000  0.000124  0.000803  3.243767
2.933333  0.000102  0.000807  3.300625
2.966667  0.000072  0.000810  3.356496
3.000000  0.000000  0.000811  3.411430
END FTABLE  2
FTABLE      3
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.036731  0.000000  0.000000  0.000000
0.033333  0.037222  0.001233  0.000000  0.148148
```

0.066667	0.037717	0.002482	0.000000	0.148148
0.100000	0.038215	0.003747	0.000000	0.148148
0.133333	0.038716	0.005029	0.000000	0.148148
0.166667	0.039220	0.006328	0.000000	0.148148
0.200000	0.039728	0.007644	0.000000	0.148148
0.233333	0.040239	0.008977	0.000000	0.148148
0.266667	0.040753	0.010327	0.000000	0.148148
0.300000	0.041271	0.011694	0.000000	0.148148
0.333333	0.041792	0.013078	0.000000	0.148148
0.366667	0.042316	0.014480	0.000000	0.148148
0.400000	0.042843	0.015899	0.000000	0.148148
0.433333	0.043374	0.017336	0.000000	0.148148
0.466667	0.043907	0.018791	0.000000	0.148148
0.500000	0.044444	0.020263	0.000000	0.148148
0.533333	0.044985	0.021754	0.000000	0.148148
0.566667	0.045528	0.023262	0.000000	0.148148
0.600000	0.046075	0.024789	0.000000	0.148148
0.633333	0.046625	0.026334	0.000000	0.148148
0.666667	0.047179	0.027898	0.000000	0.148148
0.700000	0.047736	0.029479	0.000000	0.148148
0.733333	0.048295	0.031080	0.000000	0.148148
0.766667	0.048859	0.032699	0.000000	0.148148
0.800000	0.049425	0.034337	0.000000	0.148148
0.833333	0.049995	0.035994	0.000000	0.148148
0.866667	0.050568	0.037670	0.000000	0.148148
0.900000	0.051144	0.039366	0.000000	0.148148
0.933333	0.051724	0.041080	0.000000	0.148148
0.966667	0.052306	0.042814	0.000000	0.148148
1.000000	0.052893	0.044567	0.000000	0.148148
1.033333	0.053482	0.046340	0.000000	0.148148
1.066667	0.054074	0.048133	0.000000	0.148148
1.100000	0.054670	0.049945	0.000000	0.148148
1.133333	0.055269	0.051777	0.000000	0.148148
1.166667	0.055872	0.053630	0.000000	0.148148
1.200000	0.056478	0.055502	0.000000	0.148148
1.233333	0.057086	0.057395	0.000000	0.148148
1.266667	0.057699	0.059308	0.000000	0.148148
1.300000	0.058314	0.061242	0.000000	0.148148
1.333333	0.058933	0.063196	0.000000	0.148148
1.366667	0.059555	0.065171	0.000000	0.148148
1.400000	0.060180	0.067166	0.000000	0.148148
1.433333	0.060808	0.069183	0.000000	0.148148
1.466667	0.061440	0.071220	0.000000	0.148148
1.500000	0.062075	0.073279	0.000000	0.148148
1.533333	0.062714	0.075358	0.000000	0.148148
1.566667	0.063355	0.077460	0.000000	0.148148
1.600000	0.064000	0.079582	0.000000	0.148148
1.633333	0.064648	0.081726	0.000000	0.148148
1.666667	0.065299	0.083892	0.000000	0.148148
1.700000	0.065954	0.086080	0.000000	0.148148
1.733333	0.066612	0.088289	0.000000	0.148148
1.766667	0.067273	0.090521	0.000000	0.148148
1.800000	0.067938	0.092774	0.000000	0.148148
1.833333	0.068605	0.095050	0.000000	0.148148
1.866667	0.069276	0.097348	0.000000	0.148148
1.900000	0.069950	0.099668	0.000000	0.148148
1.933333	0.070628	0.102011	0.000000	0.148148
1.966667	0.071309	0.104377	0.000000	0.148148
2.000000	0.071993	0.106765	0.000000	0.148148
2.033333	0.072680	0.109176	0.000000	0.148148
2.066667	0.073370	0.111611	0.000000	0.148148
2.100000	0.074064	0.114068	0.000000	0.148148
2.133333	0.074761	0.116548	0.000000	0.148148
2.166667	0.075462	0.119052	0.000000	0.148148
2.200000	0.076165	0.121579	0.000000	0.148148
2.233333	0.076872	0.124130	0.000000	0.148148
2.266667	0.077582	0.126704	0.000000	0.148148
2.300000	0.078296	0.129302	0.000000	0.148148
2.333333	0.079012	0.131924	0.000000	0.148148
2.366667	0.079732	0.134569	0.000000	0.148148

```
2.400000  0.080455  0.137239  0.000000  0.148148
2.433333  0.081182  0.139933  0.000000  0.148148
2.466667  0.081912  0.142651  0.000000  0.148148
2.500000  0.082645  0.145394  0.000000  0.148148
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FTABLE      1
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
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<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
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WDM      2 PREC     ENGL    1.167          IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
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<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1003 FLOW     ENGL      REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1004 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1005 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS
```

```
MASS-LINK
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<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
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  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
RCHRES     ROFLOW                          RCHRES         INFLOW
  END MASS-LINK    6

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Rainier View Manufactured Home Park

Construction Stormwater Pollution Prevention Plan

January, 2024

Turner Consulting Engineers, LLC.

4405 7th Ave. SE, Suite 300
Lacey, WA 98503
(360) 438-0301

Construction Stormwater Pollution Prevention Plan

Rainier View Manufactured Home Park
Black Diamond, Washington
January, 2024

Project Information

Project: River View Manufactured Home Park

Prepared For: **King County Housing Authority**
Contact: **Frank Kirkbride**
4405 7th Ave Se Sutie 301
Lacey, WA 98503

Project Engineer

Prepared by: Turner Consulting Engineers, LLC
4405-7th Avenue SE, Suite 301
Lacey, WA 98503
(360) 491-6900

Contact: Bill Turner, P.E.
(360) 491-6900

"I hereby state that this Construction SWPPP for **River View Manufactured Home Park** has been prepared by me or under my supervision which is usual and customary in this community for professional engineers. I understand that City of Black Diamond does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by Turner Consulting Engineerings, LLC."

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Construction Stormwater Pollution Prevention Plan

Appendices

MINIMUM REQUIREMENT #2 – Construction Stormwater Pollution Prevention Plan(SWPPP)

1.0 Introduction

The purpose of this SWPPP is to describe the proposed construction activities and all temporary and permanent erosion and sediment control (TESC) measures, pollution prevention measures, inspection/monitoring activities, and record keeping that will be implemented during the proposed construction project. The objectives of the SWPPP are to :

1. Implement Best Management Practices (BMPs) to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. Prevent violations of surface water quality, ground water quality, or sediment management standards.

3. Prevent, during the construction phase, adverse water quality impacts including impacts on beneficial uses of the receiving water by controlling peak flow rates and volumes of stormwater runoff at the Permittee's outfalls and downstream of the outfalls.

This SWPPP was prepared based on the requirements set forth in the Construction Stormwater General Permit, *Stormwater management manual for Western Washington (SWMMWW 2012).* The report is divided into eight main sections with several appendices that include stormwater related references materials. The topics presented in the each of the main sections are:

- Section 1 – INTRODCUTION. This section provides a summary description of the project, and the organization of the SEPPP document.

- Section 2 – SITE DESCRIPTION. This section provides a detailed description of the existing site conditions, proposed construction activities, and calculated stormwater flow rates for existing condition and post-conditions.

- Section 3 – CONSTRUCTION BMPs. This section provides a detailed description of the BMPs to be implemented based on the 12 required elements of the SWPPP (SWMMWW 2005).

- Section 4 – CONSTRUCTION PHASING AND BMP IMPLEMENTATION. This section proved a description of the timing of the BMP implementation in relation to the project schedule.

- Section 5 – POLLUTION PREVENTION TEAM. This Section identifies the appropriate contact names (emergency and non-emergency), monitoring personnel, and the onsite temporary erosion and sedimentation control inspector.

- Section 6 – INSPECTION AND MONITORING. This section provides a description of the inspection and monitoring requirements such as the parameters of concern to be monitored, sample locations, sample frequencies, and sampling methods for the stormwater discharge locations from the site.

- Section 7 – RECORDKEEPING. This section describes the requirements for documentation of the BMP implementation, site inspections, monitoring results, and changes to the implementation of certain BMPs due to site factors experienced during construction.

Supporting documentation and standard forms are provided in the following Appendices:

Appendix A – Site Plans
Appendix B – Construction BMPs
Appendix C – Alternative Construction BMP list
Appendix D – General Permit
Appendix E – Site Log and Inspection Forms

2.0 Site Description

2.1 Existing Conditions

This area has already been dev eloped either into homes or lawn area to provide for more homes to be constructed. Elevation difference runs from approximately elevation 650 to elevation 665 in the area where the homes will be constructed. The site borders the state highway on the east, Baker Street on the north, open ground on the west and south. There are 31 homes already constructed on First and Second street on the project site. There is a small commons area in the middle of First Street on the west side of the roadway. There are a few deciduous trees located on the west on east portion of the project site will probably have to be removed.

There is no off site flow coming onto the project site. Stormwater that falls within the roadways at this time is collected through catch basin and flow through a conveyance toward the south. . There are no steep slopes, ravens, creeks, or rivers on or adjacent to the site. This project does not have high ground water and it is not in the 100-year flood plain.

The project site is flat with very little impervious. The site is zoned as R-4 and CC by City of Black Diamond City Council.

Reviewing the Natural Resources Conservation Service (NRCS) Web Soil Survey (accessed October 21, 2023) which typically describes soil conditions the site is underlain by Beausite Gravelly Sandy loam (BeC), 6 to 15 percent slopes. The literature indicates the parent material to be till over residuum from sandstone. The material is described as well drained with the most limiting layer to transmit water to be moderately high to high. The literature further indicates that soil profile at the immediate surface is a gravelly ashy sandy loam or a very gravelly sandy loam to depths of 38 to 42 inches. Below this depth, the profile lists bedrock as the typical soil type. The literature also describes the depth to water table to be greater than 80 inches.

The existing impervious surface on the project site at this time is limited to the roadway system and the existing homes.

2.2 Proposed Construction Activities

Construction of the project will include private roads, grading of new pads for the mobile home units, parking areas, paving, utility, structures and stormwater improvements.

- Total site area: 9.35 Acres
- Proposed Area This Project 1.76 Acres
- Estimated Driveway Surface: 0.059Acres
- Estimated Roof Area: 0.60 Acres
- Percent impervious area before construction: 0.00 %

- Percent impervious area after construction: 74 %
- Disturbed area after construction: 1.76 Acres
- 2, 10- year stormwater runoff prior to construction: 0.00 cfs
- 2 – year stormwater runoff after construction: 0.00 cfs
- 10 – year stormwater runoff after construction: 0.00 cfs

3.0 Construction Stormwater BMPs

3.1 The 12 BMP Elements

Element 1:Preserve Vegetation/Mark Clearing Limits

• Prior to beginning land disturbing activities, including clearing and grading, all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area should be clearly marked, both in the field and on the plans, to prevent damage and offsite impacts.

• Plastic, metal, or stake wire fence may be used to mark the clearing limits.

• The duff layer, native topsoil, and natural vegetation shall be retained in an undisturbed state to the maximum extent practicable. If it is not practicable to retain the duff layer in place, stockpile it onsite cover it to prevent erosion, and replace it immediately upon completion of the ground disturbing activities.

Because this parcel is within the Urban Area of City of Black Diamond the clearing limits for this project are marked by the existing property lines, neighbors fences, roadway system and survey markers.

- The Contractor shall clearly identify all clearing and grubbing limits with plastic flagging or metal fence posts.
- The Contractor shall clearly fence all tree protection areas as identified by the construction drawing, certified by City of Black Diamond.
    - Suggested BMPs
      BMP C101: Preserving Natural Vegetation
      BMP C102: Buffer Zones.
      BMP C103: High Visibility Plastic or Metal Fence
      BMP C104: Stake and Wire Fence

Element 2: Establish Construction Access

• Construction vehicle access and exit shall be limited to one route if possible, or two for linear projects such as roadways where more than one access is necessary for large equipment maneuvering.

• Access points shall be stabilized with a pad of quarry spall or crushed rock, or equivalent BMP prior to traffic leaving the construction site to minimize the tracking of sediment onto public roads.

• Wheel wash or tire baths should be located onsite, if the stabilized construction entrance is not effective in preventing sediment from being tracked on public roads.

• If sediment is tracked off site, public roads shall be cleaned thoroughly at the end of each day, or more frequently during wet weather, if necessary to prevent sediment from entering waters of the state. Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area. Street washing will be allowed only after sediment is removed in this manner.

• Street wash wastewater shall be controlled by pumping back on site to an approved infiltration facility, or otherwise must be prevented from discharging into systems tributary to state surface waters. Other options include discharge to the sanitary sewer, or discharge to an approved offsite treatment system. For discharges to the sanitary sewer, permits must be obtained from the local jurisdiction providing the sewer.

Construction entrances shall be installed as shown on the plans or as directed from the Engineer or City Inspector.

- The Contractor shall establish the construction entrance as shown on the Erosion Control Site Plan and Detail Sheets before work begins on the project site.

- If sediment is tracked onto Baker Street, First or Second Street the Contractor shall take immediate and appropriate steps to remove sediments and keep roadway clean.

    - Suggested BMPs
      BMP C105: Stabilized Construction Entrance
      BMP C106: Wheel Wash

Element 3: Control Flow Rates

• Properties and waterways downstream from development sites shall be protected from erosion due to increases in the volume, velocity, and peak flow rate of stormwater runoff from the project site, as required by local plan approval authority.

• Downstream analysis is necessary if changes in flows could impair or alter conveyance systems, streambanks, bed sediment or aquatic habitat. See Volume 1, Chapter 3 for offsite analysis requirements guidlines.

• Where necessary to comply with Minimum Requirement #7, stormwater retention/detention facilities shall be constructed as one of the first steps in grading. Detention facilities shall be functional prior to construction of site improvements (e.g. impervious surfaces).

- ***The local permitting agency may require pond designs that provide additional or different stormwater flow control if necessary to address local conditions or to protect properties and waterways downstream from erosion due to increases in the volume, velocity, and peak flow rate of stormwater runoff from the project site.***

- ***If permanent infiltration ponds are used for flow control during construction, these facilities shall be protected from siltation during the construction phase and plans made for restoration after construction.***

This project will be over the 5,000 square foot threshold for requiring a downstream analysis. This site will be protected from erosion through standard BMP's such as silt fencing, slope protection, ect.. There will be very little or no increase in the volume, velocity and peak flow rate of stormwater coming from the project site.

- The Contractor shall construct one row of erosion control silt fencing as shown on the plans or as directed by the City Inspector to filter sediments from stormwater if runoff should leave construction site.

- The Contractor shall place sock filters or sediment traps in all catch basin near the project site to trap sediments for removal.

    - Suggested BMPs
      BMP C233: Silt Fence
      BMP C234: Vegetated Strip
      BMP C240 Sediment Trap

Element 4: Install Sediment Controls

- ***Prior to leaving a construction site, or prior to discharge to an infiltration facility, stormwater runoff from disturbed areas shall pass through a sediment pond or other appropriate sediment removal BMP. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Element #3, bullet #1. Full stabilization means concrete or asphalt paving; quarry spalls used as ditch lining; or the use of rolled erosion products, a bonded fiber matrix product, or vegetative cover in a manner that will fully prevent soil erosion. The local permitting authority should inspect and approve areas stabilized by means other than pavement or quarry spalls.***

- ***Sediment ponds, vegetated buffer strips, sediment barriers or filters, dikes, and other BMPs intended to trap sediment onsite shall be constructed as one of the first steps in grading. These BMPs shall be functional before other land disturbing activities take place.***

- ***Earthen structures such as dams, dikes, and diversions shall be seeded and mulched according to the timing indicated in Element #5.***

- The Contractor shall not disturb any vegetation in the tree protection areas and outside of the clearing limits in order to preserve the natural landscaping within and adjacent to the project site. The Contractor shall construct one row of erosion control silt fencing as shown on the plans or as directed by the City Inspector or Project Engineer to filter sediments from stormwater if runoff should leave construction site.

- Sediment will be removed from paved areas in and adjacent to construction work areas manually or using mechanical sweepers, as needed, to minimize tracking of sediments on vehicle tires away from the site and to minimize wash off of sediments from adjacent streets in runoff.

- Suggested BMPs
  BMP C233: Silt Fence
  BMP C234: Vegetated Strip
  BMP C240: Temporary Sediment Pond

Element 5: Stabilize Soils

- ***All exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact, flowing water, and wind.***

- ***From October 1 through April 30, no soils shall remain exposed and unworked for more than 2 days. From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days. This condition applies to all onsite soils, whether at final grade or not. These time limits may be adjusted by the County if it can be shown that the average time between storm events justifies a different standard.***

- ***Soils shall be stabilized at the end of the shift before a holiday or weekend if the weather forecast calls for precipitation.***

- ***Applicable practices include, but are not limited to, compost addition, temporary and permanent seeding, sodding, mulching, plastic covering, soil application of polyacrylamide (PAM), early application of gravel base on areas to be paved, and dust control.***

- ***Soil stabilization measures selected should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or ground water.***

- ***Soil stockpiles must be stabilized from erosion, protected with sediment-trapping measures, and located away from storm drains, waterways, or drainage channels.***

- ***Linear construction activities, including right-of-way and easement clearing, roadway development, pipelines, and trenching for utilities, shall be conducted to meet the soil stabilization requirement. Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that:***

- ***From October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days, and***
- ***From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.***

- The Contractor shall stabilize all exposed and unworked soils by application of effective BMPs such as track walking, Hydroseeding, cover with plastic or mulch to protect the soil from the erosive forces. From October 1 through April 30, no soils shall remain exposed and unworked for more than 2 days. From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days. This condition applies to all soils on site, whether at final grade or not.

- Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast. Applicable practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

- Linear construction activities, including right-of-way and easement clearing, roadway development, pipelines, and trenching for utilities, shall be conducted to meet the soil stabilization requirement. Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that:

  – from October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days and
  – from May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.

- Suggested BMPs
  BMP C120: Temporary and Permanent Seeding
  BMP C121: Mulching
  BMP C122: Nets and Blankets
  BMP C123: Plastic Covering
  BMP C124: Sodding
  BMP C125: Topsoiling
  BMP C126: Polyacrylamide for Soil Erosion Protection
  BMP C130: Surface Roughening
  BMP C131: Gradient Terraces
  BMP C140: Dust Control
  BMP C180: Small Project Construction Stormwater Pollution Prevention

Element 6: Protect Slopes

- ***Design and construct cut and fill slopes shall be designed and constructed in a manner that will minimize erosion.***

- ***Consider soil type and its potential for erosion.***
- ***Reduce slope runoff velocities by reducing the continuous length of slope with terracing and diversions, reduce slope steepness, and roughen slope surface.***

- ***Offsite stormwater (run-on) shall be diverted away from slopes and disturbed areas with interceptor dikes and swales. Offsite stormwater should be managed separately from stormwater generated on the site.***

- ***At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.***

- ***Temporary pipe slope drains shall handle the peak flow from a 10-year, 24-hour event assuming a Type 1A rainfall distribution. Alternatively, the 10-year and 25-year, 1 hour flow rates indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. If a 15-minute (or less) time step is used, no correction factor is required. The hydrologic analysis shall use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis shall use the temporary or permanent project land cover condition, whichever will produce the highest flow rates.***

- ***Permanent pipe slope drains shall be sized for the 100-year, 24-hour event.***

- ***Provide drainage to remove ground water intersecting the slope surface of exposed soil areas.***

- ***Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations.***

- ***Check dams shall be placed at regular intervals within channels that are cut down a slope.***

- ***Stabilize soils on slopes, as specified in Element #5.***

Excavation of slopes is not likely on this project. If the contractor should required excavation of the slopes then it shall be completed as follows.

- The Contractor shall construct cut and fill slopes in a manner that will minimize erosion and reduce slope runoff velocities. Tracking walking exposed slopes and/or laying matting or mulch to protect soils will be required for all slopes great than 10 to 1.

- Suggested BMPs
  BMP C120: Temporary and Permanent Seeding
  BMP C130: Surface Roughening
  BMP C200: Interceptor Dike and Swale
  BMP C201: Grass-Lined Channels
  BMP C204: Pipe Slope Drains
  BMP C205: Subsurface Drains
  BMP C206: Level Spreader
  BMP C207: Check Dams
  BMP C208: Triangular Silt Dike (Geotextile-Encased Check Dam).

Element 7: Protect Drain Inlets

• All storm drain inlets made operable during construction shall be protected so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

• All approach roads shall be kept clean, and all sediment and street wash water shall not be allowed to enter storm drains without prior and adequate treatment, unless treatment is provided before the storm drain discharges to waters of the State.

• Inspect inlets weekly at a minimum and daily during storm events. Clean inlet protection devices, or remove and replace when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

- The Contractor shall protect all storm drain inlets made operable during construction with the filter apparatus shown on the erosion control detail sheet. All inlets shall be inspected weekly at a minimum and daily during storm events or as directed by the Engineer. Inlet protection devices should be cleaned or removed and replaced when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer). There are no storm drain inlets near the site that could potentially receive surface runoff from the construction site.

  - Suggested BMPs
    BMP C220: Storm Drain Inlet Protection

Element 8: Stabilize Channels and Outlets

• All temporary onsite conveyance channels shall be designed, constructed and stabilized to prevent erosion from the peak 10-minute flow velocity from a Type 1A 10-year 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour time step flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. If a 15-minute (or less) time step is used, no correction factor is required. The hydrologic analysis shall use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis shall use the temporary or permanent project land cover condition, whichever will produce the highest flow rates.

• Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes and downstream reaches shall be provided at the outlets of all conveyance systems.

There are no channels or outlets on or adjacent to the project site therefore stormwater from this project will be allowed to sheet flow across the ground and infiltrate or flow into the City stormwater sewer system.

- The Contractor shall direct the stormwater to areas where it can be cleaned or infiltrated into the ground through sheet flowing across the natural ground or towards the stormwater sewer system located with the city roadway.

    - Suggested BMPs
      BMP C202: Channel Lining
      BMP C209: Outlet Protection

Element 9: Control Pollutants

• All pollutants, including waste materials and demolition debris that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Woody debris may be chipped, ground or chopped and spread on site.

• Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and non-inert wastes present on the site (see Chapter 173-304 WAC for the definition of inert waste). Onsite fueling tanks shall include secondary containment.

• Maintenance and repair of heavy equipment and vehicles involving oil changes, hydraulic system drain down, solvent and de-greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into stormwater runoff must be conducted using spill prevention measures, such as drip pans. Contaminated surfaces shall be cleaned immediately following any discharge or spill incident. Report all spills to 911. Emergency repairs may be performed onsite using temporary plastic placed beneath and, if raining, over the vehicle.

• Wheel wash, or tire bath wastewater, shall be discharged to a separate onsite treatment system or to the sanitary sewer if allowed by the local wastewater authority.

• Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' label recommendations shall be followed for application rates and procedures.

• BMPs shall be used to prevent or treat contamination of stormwater runoff by pH modifying sources. These acidic or basic sources include, but are not limited to, bulk

cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters. Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the receiving water.

• Construction sites shall adjust the pH of stormwater if necessary to prevent violations of water quality standards. Projects must obtain written approval from the Department of Ecology prior to using chemical treatment other than CO_2 or dry ice to adjust pH.

- The Contractor shall ensure all pollutants, including waste materials and demolition debris, which occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Woody debris may be chopped and spread on site.

- All chemicals, liquid products, petroleum products, and non-inert wastes present on the site (see Chapter 173-304 WAC for the definition of inert waste), shall be covered, contained, and protected from vandalism. On-site fueling tanks shall include secondary containment.

- Maintenance and repair of heavy equipment and vehicles involving oil changes, hydraulic system drain down, solvent and de-greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into stormwater runoff must be conducted using spill prevention measures, such as drip pans. Contaminated surfaces shall be cleaned immediately following any discharge or spill incident. Emergency repairs may be performed on-site using temporary plastic placed beneath and, if raining, over the vehicle.

- Wheel wash or tire bath wastewater shall be discharged to a separate on-site treatment system or to the sanitary sewer.

- Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application rates and procedures shall be followed.

- BMPs shall be used to prevent or treat contamination of stormwater runoff by pH modifying sources. These sources include, but are not limited to, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters. Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the receiving water.

- Construction sites with significant concrete work shall adjust the pH of stormwater if necessary to prevent violations of water quality standards.

• Suggested BMPs
BMP C151: Concrete Handling
BMP C152: Sawcutting and Surfacing Pollution Prevention
See Volume IV – Source Control BMPs

Element 10: Control De-Watering

- ***All foundation, vault, and trench de-watering water, which has similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system, prior to discharge to a sediment trap or sediment pond. Channels must be stabilized, as specified in Element #8.***

- ***Clean, non-turbid de-watering water, such as well-point ground water, can be discharged to systems tributary to state surface waters, as specified in Element #8, provided the de-watering flow does not cause erosion or flooding of the receiving waters. These clean waters should not be routed through sediment ponds with stormwater.***

- ***Highly turbid or otherwise contaminated dewatering water, such as from construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam, shall be handled separately from stormwater at the site.***

- ***Other disposal options, depending on site constraints, may include: 1) infiltration, 2) transport offsite in vehicle, such as a vacuum flush truck, for legal disposal in a manner that does no pollute state waters, 3) Ecology-approved onsite treatment using chemical treatment or other suitable treatment technologies, or 4) sanitary sewer discharge with local sewer district approval, if there is no other option, 5) use of sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.***

- If de-water should occur on this project from the foundation pour or concrete slabs, the Contractor shall either discharge into designated areas as directed by the Engineer or transport offsite to an approval disposal site. If discharged on-site the Contract shall construct the spreader trench in such a manner as to allow the water to sheet flow through the project site for infiltration. All de-watering shall be infiltrated on-site and not be directed to adjacent property.

Element 11: Maintain BMPs

- ***All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. All maintenance and repair shall be conducted in accordance with BMPs.***

- ***Sediment control BMPs shall be inspected weekly or after a runoff-producing storm event during the dry season and daily during the wet season.***

- ***All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal of BMPs or vegetation shall be permanently stabilized.***

- The Contractor shall ensure that all temporary and permanent erosion and sediment control BMPs are maintained and repaired in accordance with the BMP specification and as needed to assure they are in proper working order. All temporary erosion and sediment control BMPs shall be removed within 30 days after site stabilization is achieved or not longer needed. All trapped sediment shall be either stabilized on site or removed to an approved disposal site.

Element 12: Manage The Project

- ***Phasing of Construction - Development projects shall be phased where feasible in order to prevent, to the maximum extent practicable, the transport of sediment from the project site during construction. Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities for any phase.***

  Clearing and grading activities for developments shall be permitted only if conducted pursuant to an approved site development plan (e.g., subdivision approval) that establishes permitted areas of clearing, grading, cutting, and filling. When establishing these permitted clearing and grading areas, consideration should be given to minimizing removal of existing trees and minimizing disturbance/compaction of native soils except as needed for building purposes. These permitted clearing and grading areas and any other areas required to preserve critical or sensitive areas, buffers, native growth protection easements, or tree retention areas as may be required by local jurisdictions, shall be delineated on the site plans and the development site.

  All plats shall include lot-specific grading plans, including information specified by the local permitting authority such as finished grades, finished floor elevations, buildable areas, and identified drainage outlets. This information would normally be submitted with the construction drawings, but may be required prior to preliminary plat approval.

- ***Inspection and Monitoring – All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspection shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. The person must have the skills to 1) assess the site conditions and construction activities that could impact the quality of stormwater, and 2) assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.***

Whenever inspection and/or monitoring reveals that the BMPs identified in the construction SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible.

The SWPPP shall be modified whenever there is a significant change in the design, construction, operation, or maintenance at the construction site that as, or could have, a significant effect on the discharge of pollutants to waters of the state.

The SWPPP shall be modified, if during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven (7) calendar days following the inspection.

- ***Seasonal Work Limitations – In Olympia—except where approved chemical treatment, full dispersion or infiltration is practiced— clearing, grading, and other soil disturbing activities are prohibited in all watersheds between October 15 and April 1.***

Based on the information provided, and/or local weather conditions, the local permitting authority may expand or restrict the seasonal limitation on site disturbance. If, during the course of any construction activity or soil disturbance during the seasonal limitation period, silt-laden runoff leaving the construction site causes a violation of the surface water quality standard or if clearing and grading limits or erosion and sediment control measures shown in the approved plan are not maintained, the local permitting authority may take enforcement action, including but not limited to a notice of violation, administrative order, fine/penalty, stop-work order, or correction notice.

The following activities are exempt from the seasonal clearing and grading limitations:

1. ***Routine maintenance and necessary repair of erosion and sediment control BMPs;***
2. ***Routine maintenance of public facilities or existing utility structures that do not (a) expose the soil or (b) result in the removal of the soil's vegetative cover; and***
3. ***Self-contained project sites, where there is complete infiltration of the water quality design event runoff within the site.***

Local governments may restrict clearing and grading activities where site conditions may present a significant risk of impact to property or critical areas. Contact the local permitting authority for information on specific site restrictions.

- ***Coordination with Utilities and Other Contractors - The primary project proponent shall evaluate, with input from utilities and other contractors, the stormwater management requirements for the entire project, including the utilities, when preparing the Construction SWPPP.***

- ***Inspection and Monitoring - All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspections shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control. The person shall have the skills to (1) assess site conditions and construction activities that could impact stormwater runoff quality, and (2) assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.***

  A Certified Erosion and Sediment Control Specialist shall be identified in the Construction SWPPP and shall be onsite or on-call at all times. Certification may be obtained an approved training program that meets the erosion and sediment control training criteria established by Ecology. If a pre-construction meeting is held, this person shall attend.

  Sampling and analysis of the stormwater discharges from a construction site may be necessary on a case-by-case basis to ensure compliance with standards. Monitoring and reporting requirements may be established by the local permitting authority when necessary.

  The following discharge standard applies:

  - ***Runoff leaving the construction site shall be free of settleable solids, as measured with an Imhoff Cone and in accordance with Standard Methods for the Examination of Water and Wastewater, most recent edition, American Water Works Association. "Free of settleable solids" shall be defined as measuring less than 2.5 mL/L/hr, for storms up to the water quality design event .***

  The following surface water standard applies:

  - ***For storms up to the water quality design event, turbidity downstream of a construction site may not increase more than 5 NTU, if upstream turbidity is 50 NTU or less, and may not increase more than 10 percent, if upstream turbidity is over 50 NTU. To the extent practicable, samples should be taken far enough downstream so that the construction site discharge has been well-mixed with the surface water.***

- ***Maintaining an Updated Construction SWPPP The SWPPP shall be retained onsite or within reasonable access to the site.***

The SWPPP shall be updated within 7 days to reflect any significant changes in the design, construction, operation, or maintenance at the construction site that have, or could have, a significant effect on the discharge of pollutants to waters of the state.

The SWPPP shall be updated within 7 days if during inspections or investigations by site staff or local or state officials, it is determined that the SWPPP is ineffective in controlling pollutants such that applicable discharge or surface water standards violations are apparent.

Element 13: Protect Low Impact Development BMP's

• Protect all Bioretention and Rain Garden BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden BMPs.

• Restore Bioretention and Rain Garden BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMP includes removal of sediment and any sediment-laden Bioretention/Rain Garden soils, and replacing the removed soils with soils meeting the design specification.

• Prevent compaction of Bioretention, Rain Garden, and other infiltration BMPs by excluding construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

• Protect surrounding land uses from erosion and manage to avoid introducing sediment onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-lade runoff onto permeable pavements. • Clean pavements fouled with sediments or no longer passing an initial infiltration test using procedures acceptable to the County or in accordance with manufacturer's procedures.

• Keep heavy equipment off of existing soils under LID facilities (Bioretention, Rain Gardens, Infiltration Ponds, Permeable Pavements, etc.) that have been excavated to final grade to retain the infiltration rate of the soils.

Suggested BMPs

o BMP C102: Buffer Zone
o BMP C103: High Visibility Fence
o BMP C200: Interceptor Dike and Swale
o BMP C201: Grass-Lined Channels o BMP C207: Check Dams
o BMP C208: Triangular Silt Dike (TSD) (Geotextile-Encased Check Dam).
o BMP C231: Brush Barrier o BMP C233: Silt Fence
o BMP C234: Vegetated Strip

o Additional Guidance: See Chapter 5: Precision Site Preparation and Construction in the LID Technical Guidance Manual for Puget Sound for more detail on protecting LID integrated management practices.

Site specific BMPs are shown on the TEC Plan Sheets and Details in Appendix A. These site specific plan sheets will be updated annually.

4.0 Construction Phasing and BMP Implementation

The BMP implementation schedule will be driven by the construction schedule. The following provides a sequential list of the proposed construction schedule milestones and the corresponding BMP implementation schedule. The list contains key milestones such as wet season construction.

The BMP implementation schedule listed below is keyed to proposed phases of the construction project, and reflects differences in BMP installations and inspections that relate to wet season construction. The project site is located west of the Cascade Mountain Crest. As such, the dry season is considered to be from May 1 to September 30 and the wet season is considered to be from October 1 to April 30.

- Estimate of Construction start date: Upon Plan Approval
- Estimate of construction finish date: 1.5-years
- Mobilize equipment on site: Upon Plan Approval
- Mobilize and store all ESC and soil stabilization products: _____
- Install stabilized construction entrance: Upon Plan Approval
- Begin clearing and grubbing: Upon Plan Approval
-

5.0 Pollution Prevention Team

Roles and Responsibilities

The pollution prevention team consists of personnel responsible for implementation of the SWPPP, including the following:

- Certified Erosion and Sediment Control Lead (CESCL) – primary contractor contact, responsible for site inspections (BMPs, visual monitoring, sampling, ect,); to be called upon in case of failure of any ESC measures.

- Resident Engineer – for projects with engineered structures only (sediment ponds, traps, sand filters, etc.): site representative for the owner that is the project's supervising engineer responsible for inspections and issuing instructions and drawings to the contractor's site supervisor or representative.

- Emergency Ecology Contact – individual to be contacted at Ecology in case of emergency.

- Emergency Owner Contact – individual that is the site owner or representative of the site owner to be contacted in the case of emergency.

- Non-Emergency Ecology Contact – individual that is the site owner or representative of the site owner than can be contacted if required.

- Monitoring Personnel – personnel responsible for conducting water quality monitoring; for most sites this person is also the Certified Erosion and Sediment Control Lear.

Team Members

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Building Contractor	
Resident Engineer	City of Black Diamond	
Emergency Ecology Contact	Report a Spill	(360) 407-6300
Emergency Owner Contact	Frank Kirkbride	(360) 491-6900
Non-Emergency Ecology Contact		
Monitoring Personnel		

6.0 Site Inspections and Monitoring

Site inspection and monitoring includes visual inspection, monitoring for water quality parameters of concern and documentation of the inspection and monitoring findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;

- Site inspections; and

- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the sit log book. This SWPPP may function as the site log book if desired, or the forms may be separated and included in a separate site log book. If log book and SWPPP is separated, the site log book must be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

Site Inspection

All BMPs will be inspected, maintained and repaired as needed to assure continued performance of their intended function. Site inspections will be conducted by a person who is knowledgeable in the principles and practices or erosion and sediment control. The onsite inspector will have the skills to assess the potential for water quality impacts as a result of the type of construction activities occurring on site, and the knowledge of the appropriate and effective ESC measures needed to control the quality of stormwater discharges.

All BMPs will be inspected, maintained and repaired as needed to assure continued performance of their intended function. The inspector will be a Certified Erosion and Sediment Control Lead (CESCL) per BMP C160. The name and contact information of the CESCL is provided in Section 5 of this SWPPP.

Site inspection will occur in all areas disturbed by construction activities and at all stormwater discharge points. Stormwater will be examined for the presence of suspended sediment, turbidity, discoloration, and oily sheen. The site inspector will evaluate and document the effectiveness of the installed BMPs and determine if it is necessary to repair or replace any of the BMPs to improve the quality of stormwater discharges. All maintenance and repairs will be documented in the site log book or forms provided in this document. All new BMPs or design changes will be documented in the SWPPP as soon as possible.

Site Inspection Frequency

Site inspections will be conducted at least once a week and within 24 hours following any discharge from the site. For sites with temporary stabilization measures, the site inspection frequency can be reduced to once every month.

Site Inspection Documentation

The site inspector will record each site inspection using the site log inspection forms provided in the Appendix E. The site inspection log forms may be separated from the SWPPP document, but will be maintained on-site or within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

Stormwater Quality Monitoring

Monitoring requirements for the proposed project will include turbidity sampling to monitor site discharges for water quality compliance with the Construction Stormwater General Permit (Appendix D). Sampling will be conducted at all site discharge points at least once per calendar week. A discharge point or outfall is any point along the perimeter of the project site where water leaves (during hours of construction).

Refer to permit section S4.G for sampling procedures and guidance manual references.

Turbidity monitoring will follow the analytical methodologies described in Section S$ of the Construction Stormwater General Permit (Appendix D). The key benchmark values that require action include 25 NTU and 250 NTU for turbidity. If the 25 NTU benchmark for turbidity is exceeded, the following steps will be conducted:

1. Ensure all BMPs specified in this SWPPP are installed and functioning as intended.

2. Assess whether additional BMPs should be implemented and make revisions to the SWPPP as necessary.

3. Sample the discharge location daily until the analysis results are less than the 25 NTU (turbidity) or 32 cm (transparency).

If the turbidity is greater than 25 NTU but less than 250 NTU for more than 3 days, additional treatment BMPs will be implemented within 24 hours of the third consecutive sample that exceeded the benchmark value. Additional treatment BMPs will include, but are not limited to, off-site treatment, infiltration, filtration and chemical treatment.

If the 250 NTU bench mark for turbidity is exceeded at any time, the following steps will be conducted:

1. Notify Ecology by phone within 24 hours of analysis.

2. Continue daily sampling until the turbidity is less than 25 NTU.

3. Initiate additional treatment BMPs such as off-site treatment, infiltration, filtration and chemical treatment within 24 hours of the first 250 NTU exceedance.

4. Implement additional treatment BMPS as soon as possible, but within 7 days of the first 250 NTU exceedance.

5. Describe inspection results and remedial actions that are taken in the site log book and in monthly discharge monitoring reports.

pH Sampling

Stormwater runoff will be monitored for pH staring on the first day of any activity that includes more than 40 yards of poured or recycled concrete, or after the application of "Engineered Soils" such as, Portland cement treated base, cement kiln dust, or fly ash. This does not include fertilizers. For engineered soils, the pH monitoring period begins

when engineered soils are first exposed to precipitation and continue until the area is fully stabilized.

Stormwater samples will be collected daily from all points of discharge from the site and measured for pH using a calibrated pH meter, pH test kit, or wide range pH indicator paper. If the measured pH is 8.5 or greater, the following steps will be conducted:

1. Prevent the high pH water from entering storm drains or surface water.

2. Adjust or neutralize the high pH water if necessary using appropriate technology such as CO_2 sparging (liquid or dry ice).

3. Contact Ecology if chemical treatment other than CO_2 sparging is planned.

7.0 Reporting and Recordkeeping

Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements;
- Site inspections; and
- Stormwater quality monitoring.

For convenience, the inspection form and water quality monitoring forms included in this SWPPP include the required information for the site log book.

Records Retention

Records of all monitoring information (site log book, inspection reports/check lists, etc.), this Stormwater Pollution Prevention Plan, and nay other documentation of compliance with permit requirements will be retained during the life of the construction project and for a minimum of three years following the termination of permit coverage in accordance with permit condition S5.C.

Access to Plans and Records

The SWPPP, General Permit, Notice of Authorization letter, and Site Log Book will be retained on site or within reasonable access to the site and will be made immediately available upon request to Ecology or the local jurisdiction. A copy of the SWPPP will be provided to Ecology within 14 days of receipt of a written request for the SWPPP from Ecology. Any other information requested by Ecology will be submitted within a reasonable time. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with permit condition S5.G.

Updating the SWPPP

In accordance with Conditions S3, S4.B.3 of the General Permit, this SWPPP will be modified if the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site or there has been a change in design, construction, operation, or maintenance at the site that has a significant effect or the discharge, or potential for discharge, of pollutants to the waters of the State. The SWPPP will be modified within seven days of determination based on inspection(s) that additional or modified BMPs are necessary to correct problems identified, and an updated timeline for BMP implementation will be prepared.

Reporting

Discharge Monitoring Reports

If cumulative soil disturbance is smaller than 5 acres: Discharge Monitoring Report (DMR) forms will not be submitted to Ecology because water quality sampling is ot being conducted at the site.

If cumulative soil disturbance is 5 acres or larger: Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. If there was no discharge during a given monitoring period, the Permittee shall submit the form as required, with the words "No discharge" entered in the place of monitoring results. If a benchmark was exceeded, a brief summary of inspection results and remedial actions taken will be included. If sampling could not be performed during a monitoring period, a DMR will be submitted with an explanation of why sampling could not be performed.

Notification of Noncompliance

If any of the terms and conditions of the permit are not met, and it causes a threat to human health or the environment, the following steps will be taken in accordance with permit section S5.F:

1. Ecology will immediately notified of the failure to comply.

2. Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.

3. A detailed written report describing the noncompliance will be submitted to Ecology within (5) days, unless requested earlier by Ecology.

Any time turbidity sampling indicates turbidity is 250 nephelometric turbidity units (NTU) or greater or water transparency is 6 centimeters or less, the Ecology regional

office will be notified by phone within 24 hours of analysis as required by permit condition S5.A (see Section 5.0 of this SWPPP for contact information).

In accordance with permit condition S4.F.6.b, the Ecology regional office will be notified if chemical treatment other than CO_2 sparging is planned for adjustment of high pH water (see Section 5.0 of this SWPPP for contact information).

Permit Application and Changes

In accordance with permit condition S2.A, a complete application form will be submitted to Ecology and the appropriate local jurisdiction (if applicable) to be covered by the General Permit.

Appendix A – Site Plan

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
NORTHING: 114872.14
EASTING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying

FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

REVISION BLOCK:
2nd Revision

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View
Manufactured Home Park
Removal & Relocation Site Plan

WILLIAM E. TURNER — STATE OF WASHINGTON — 33824 — REGISTERED PROFESSIONAL ENGINEER

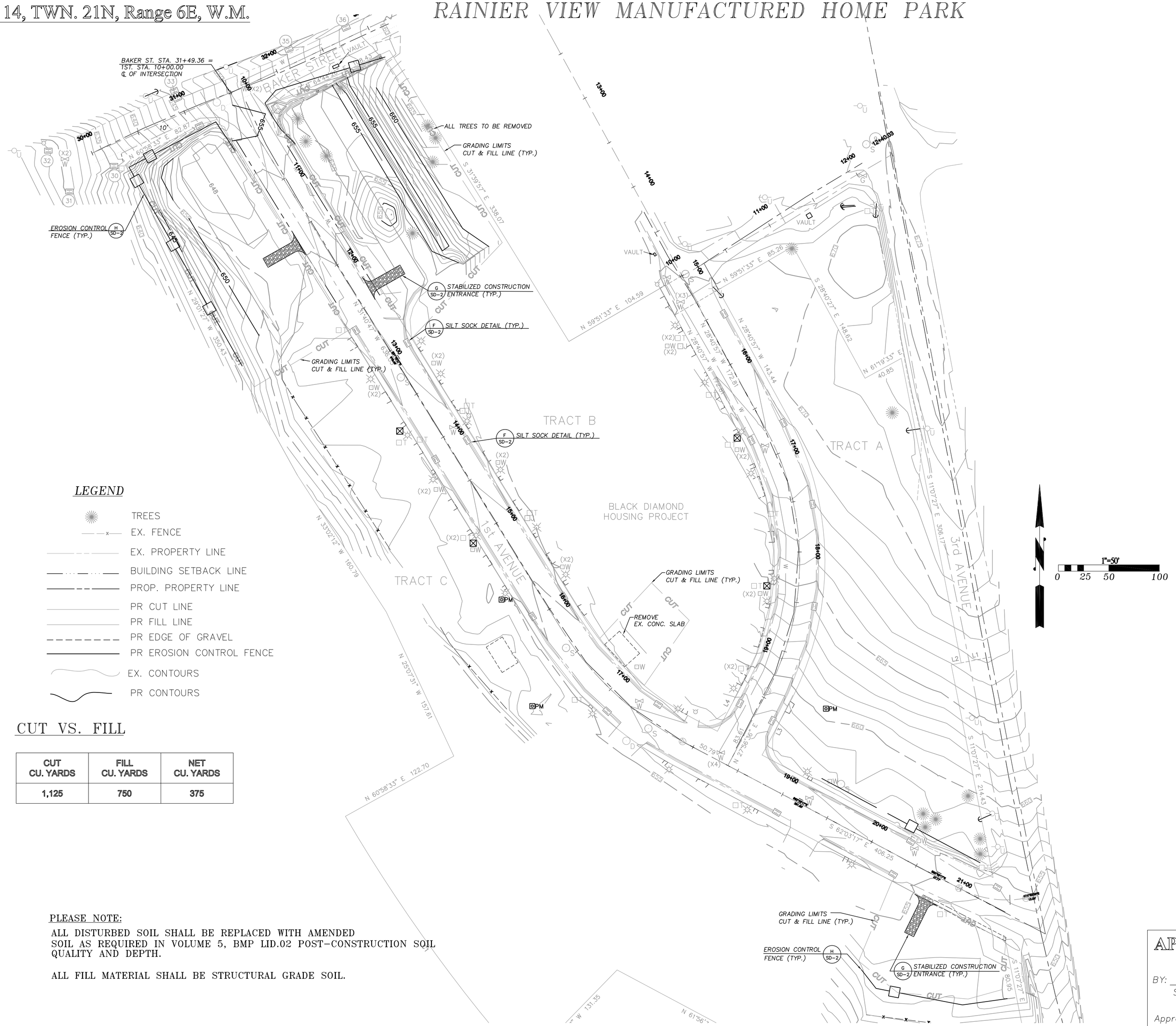
1-10-24

SHEET ID CODE
RS 1 of 1

SHEET No.
3 of 19

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



LEGEND

- TREES
- EX. FENCE
- EX. PROPERTY LINE
- BUILDING SETBACK LINE
- PROP. PROPERTY LINE
- PR CUT LINE
- PR FILL LINE
- PR EDGE OF GRAVEL
- PR EROSION CONTROL FENCE
- EX. CONTOURS
- PR CONTOURS

CUT VS. FILL

CUT CU. YARDS	FILL CU. YARDS	NET CU. YARDS
1,125	750	375

PLEASE NOTE:

ALL DISTURBED SOIL SHALL BE REPLACED WITH AMENDED SOIL AS REQUIRED IN VOLUME 5, BMP LID.02 POST-CONSTRUCTION SOIL QUALITY AND DEPTH.

ALL FILL MATERIAL SHALL BE STRUCTURAL GRADE SOIL.

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
NORTHING: 114872.14
EASTING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying
FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

2nd Revision

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Erosion Control & Grading Site Plan

WILLIAM P. TURNER — STATE OF WASHINGTON — 35824 — REGISTERED PROFESSIONAL ENGINEER

1-10-24

GR 1 OF 1

19 of 19

Storm Drainage General Notes:

1. All work shall conform to City of Black Diamond Standards, the Stormwater Management Manual for Western Washington by the Department of Ecology, and the WSDOT Standard Specifications.

2. Temporary erosion / water pollution measures shall be required in accordance with the Stormwater Management Manual for Western Washington by the Department of Ecology and as follows:
   a. Soil erosion and water pollution/flood control plans shall be submitted to the City, approved by the City, and implemented by the contractor prior to disturbing any soil on the site. Submittal and approval of these plans shall preclude any construction activity on the site.
   b. All permanent storage and retention/detention areas used as part of the temporary erosion control and water pollution / flood activities and conveyance system shall be cleaned of all silts, sand, and other materials following completion of construction and the permanent facilities shall then be completed including permanent infiltration areas. If an infiltration pond is to be used on a temporary basis for a sediment control pond, a protective layer of fine soil as determined by an engineer shall be installed in order to protect the infiltrative capacity of the ultimate underlying soil

3 Compliance with all other permits and other requirements by the City of Black Diamond and/or other governing authorities shall be required.

4 A preconstruction meeting shall be held with the City prior to the start of construction.

5 All storm mains and retention/detention areas shall be staked for grade and alignment by an engineering or surveying firm capable of performing such work, and currently licensed in the State of Washington to do so.

6 Storm drain pipe shall meet the following requirements:

   a. Polyvinyl Chloride: PVC pipe shall conform to ASTM D 3034, SDR 35 or ASTM F 789 with joints and rubber gaskets conforming to ASTM D3212 and ASTM F4777.
   b. Plain Concrete: Plain concrete pipe per WSDOT Standard Specifications.
   c. Reinforced Concrete: Reinforced concrete pipe per WSDOT Standard Specifications.
   d. Ductile Iron: Ductile iron pipe shall conform to AWWA C151 Class 50 and have a cement mortar lining conforming to AWWA C104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA.
   e. Polyethylene: PE smooth wall pipe per Advanced Drainage Systems (ADS) N-12 (bell and spigot), or City approved equal, constructed per WSDOT Standard Specifications.

7. Special structures, oil/water separators and outlet controls shall be installed per plans and manufacturers recommendations.

8. All disturbed areas shall receive permanent erosion control in the form of vegetation establishment such as grass seeding or hydroseeding. A means shall be established to protect the permanent storm drain system prior to establishment of the permanent erosion control measures. This method shall be included in the soil erosion and water pollution/flood control plans.

9. Provide traffic control plan(s) as required in accordance with MUTCD.

10. Call underground locate line 1-800-424-5555 a minimum of 48 hours prior to any excavations.

11. Storm drain pipelines shall be installed to the far property line(s) to serve adjacent tributary areas as may be warranted. They shall be appropriately sized to accommodate flows as further identified herein. Pipes shall be designed to facilitate a minimum 2.5 feet/second flow unless otherwise approved by the City Engineer.

12. All storm water pipes shall be pressure tested between catch basins and TV inspected.

13. Natural surface water shall bypass all retention and detention storm systems.

Erosion Control General Notes:

1. Approval of this erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).

2. The implementation of these ESC plans and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established.

3. The boundaries of the clearing limits shown on this plan shall be clearly marked in the field prior to construction. During the construction period, no disturbance beyond the marked clearing limits shall be permitted. The marking shall be maintained by the applicant/contractor for the duration of the construction.

4. The ESC facilities shown on this plan must be constructed 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 & utility standards.

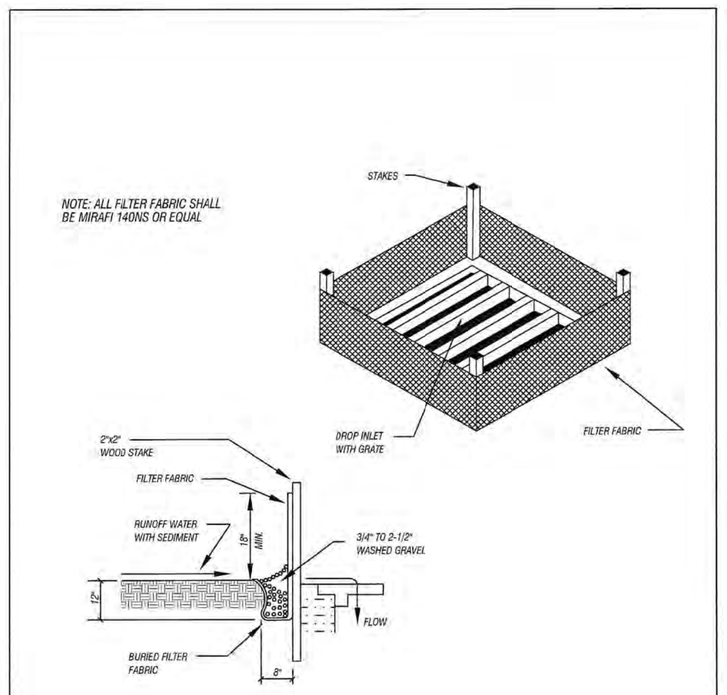
5. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and to ensure that sediment and sediment-laden water do not leave the site.

6. The ESC facilities shall be inspected daily by the applicant/contractor and maintained as necessary to ensure their continued functioning.

7. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within the 48 hours following a major storm event.

8. At no time shall more than 1' of sediment be allowed to accumulate within a the sump of a trapped catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.

9. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.



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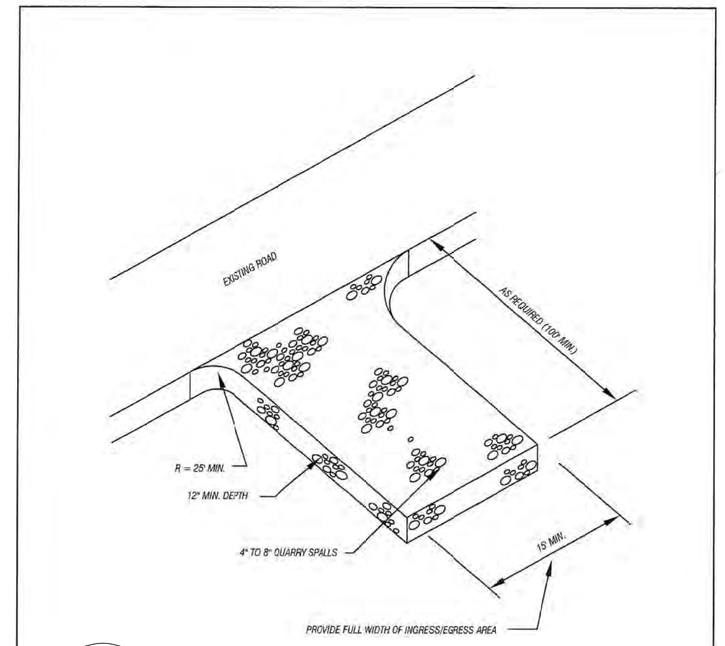
SD-2

6-04-07

CITY OF BLACK DIAMOND | INLET PROTECTION - FILTER FABRIC FENCE | STANDARD DWG EC-3 | NOT TO SCALE | 01/01/08 | PacWest Engineering Fife, Washington

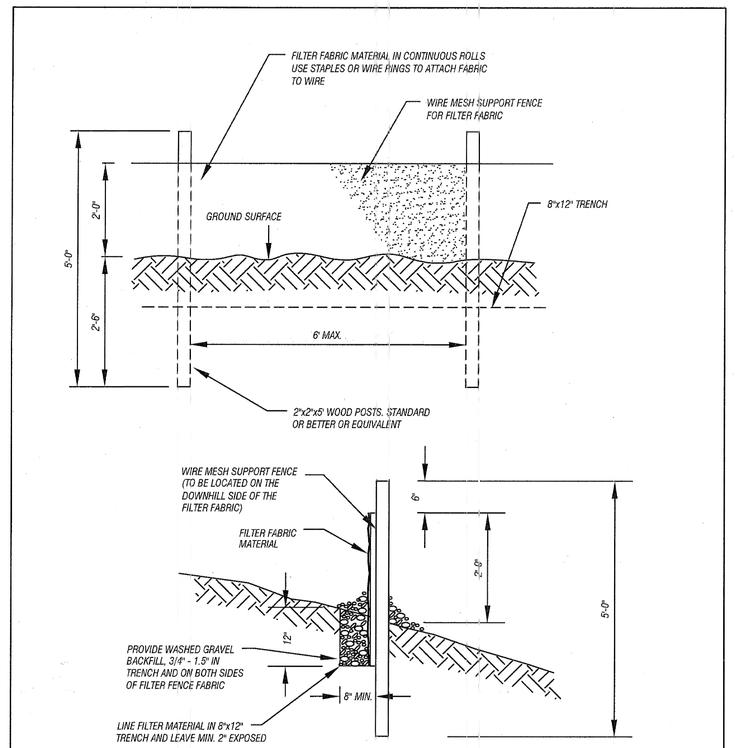


G
SD-2

NOTE:
INSTALL DRIVEWAY CULVERT IF THERE IS A ROADSIDE DITCH PRESENT.

6-04-07

CITY OF BLACK DIAMOND | CONSTRUCTION ENTRANCE | STANDARD DWG EC-1 | NOT TO SCALE | 01/01/08 | PacWest Engineering Fife, Washington



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SD-2

6-04-07

CITY OF BLACK DIAMOND | SILT FENCE | STANDARD DWG EC-2 | NOT TO SCALE | 01/01/08 | PacWest Engineering Fife, Washington

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION	
DESIGNED	1/10/24
DRAWN	1/10/24
CHECKED	1/10/24
PLOTTED DATES	

REVISION BLOCK:
2nd Revision

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Street Drainage & Erosion Control
General Notes & Details

WILLIAM R. TURNER — STATE OF WASHINGTON — 33824 — REGISTERED PROFESSIONAL ENGINEER

1-10-24

SHEET ID CODE
SD 2 of 4

SHEET No.
12 of 19

Appendix B – Construction BMPs

BMP C101: Preserving Natural Vegetation
BMP C102: Buffer Zones
BMP C103: High Visibility Plastic or Metal Fence
BMP C104: Stake and Wire Fence
BMP C105: Stabilized Construction Entrance
BMP C106: Wheel Wash
BMP C107: Construction Road/Parking Area Stabilization
BMP C140: Dust Control
BMP C220: Storm Drain Inlet Protection
BMP C233: Silt Fence
Infiltration Trench

Appendix C – Alternative BMPs

The following includes a list of possible alternative BMPs for each of the 12 elements not described in the main SWPPP text. This list can be referenced in the event a BMP for a specific element is not functioning as designed and an alternative BMP needs to be implemented.

Element #1 – Mark Clearing Limits

Element #2 – Establish Construction Access

Element #3 – Control Flow Rates

Straw Bales
Quarry Spalls or Light Loose Rip Rap

Element #4 – Install Sediment Controls

Straw Bales
Early application of gravel base for roads to be paved

Element #5 – Stabilize Soils

Track Walking
Jute Matting
Straw Mulch

Element #6 – Protect Slopes

Track Walking
Jute Matting
Straw Mulch

Element #7 – Protect Drain Inlets

Straw Bales

Element #8 – Stabilize Channels and Outlets

Element #9 – Control Pollutants

Element #10 – Control Dewatering

Appendix D – Site Inspection Forms (and Site Log)

The results of each inspection shall be summarized in an inspection report or checklist that is entered into or attached to the site log book. It is suggested that the inspection report or checklist be included in this appendix to keep monitoring and inspection information in one document, but this is optional. It is mandatory that this SWPPP and the site inspection forms be kept on-site at all times during construction and that inspections be performed and documented as outlined below.

At a minimum, each inspection reportor checklist shall include:

a. Inspection date/times

b. Weather information: general conditions during inspection, approximate amount of precipitation since the last inspection, and approximate amount of precipitation within the last 24 hours.

c. A summary or list of all BMPs that have been implemented, including observations of all erosion/sediment control structures or practices.

d. The following shall be noted:

   i. locations of BMPs inspected
   ii. locations of BMPs that need maintenance,
   iii. the reason maintenance is needed,
   iv. locations of BMPs that failed to operate as designed or intended, and
   v. locations where additional or different BMPs are needed, and the reasons(s) why

e. A description of stormwater discharged from the site. The presence of suspended sediment, turbid water, discoloration, and/or oil sheen shall be noted, as applicable.

f. A description of any water quality monitoring performed during inspection, and the results of that monitoring.

g. General comments and notes, including a brief description of any BMP repairs, maintenance or installations made as a result of the inspection.

h. A statement that in the judgment of the person conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the SWPPP and the NPDES permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions required to bring the site back into compliance, as well as a schedule of implementation.

i. Name, title, and signature of person conducting the site inspection and the following statement; "I certify under penalty of law that this report is true, accurate, and complete, to the best of my knowledge and belief".

When the site inspection indicates that the site is not in compliance with any terms and conditions of the NPDES permit, the Permittee shall take immediate action(s) to: stop, contain, and clean up the unauthorized discharges, or otherwise stop the noncompliance; correct the problem(s); implement appropriate Best Management Practices (BMPs), and/or conduct maintenance of existing BMPs; and achieve compliance with all applicable standards and permit conditions. In addition, if the noncompliance causes a threat to human health or the environment, the Permittee shall comply with the Noncompliance Notification requirements in Special Condition S5.F of the permit.

Water Quality Monitoring

Was any water quality monitoring conducted? □ Yes □ No

If water quality monitoring was conducted, record results here:

If water quality monitoring indicated turbidity 250 NTU or greater; or transparency 6 cm or less, was Ecology notified by phone within 24 hrs?

□ Yes □ No

If Ecology was notified, indicate the date, time, contact name and phone number below:

Date:
Time:
Contact Name:
Phone #:

General Comments and Notes

Include BMP repairs, maintenance, or installations made as a result of the inspection.

Were Photos Taken? □ Yes □ No

If photos taken, describe photos below:

Rainier View Manufactured Home Park Project

Drainage Report

January, 2024

Turner Consulting Engineers, L.L.C.
4405 7th Ave. SE Suite 301
Lacey, WA 98503
(360) 491-6900

Preliminary Drainage Report

King County Housing Authority

King County, Washington

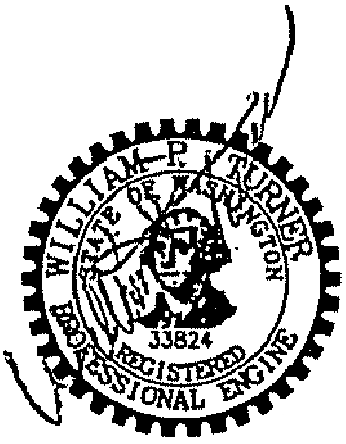
January, 2024

Project Information

Project:	*Rainier View Manufactured Home Park Project*
Prepared For:	King County Housing Authority
Contact:	Frank Kirkbride 4405 7th Ave SE Suite 301 Lacey, WA 98503 (360) 491-6900

Project Engineer

Prepared by:	Bill Turner, P.E. 4405-7th Avenue SE, Suite 301 Lacey, WA 98503 (360) 491-6900
Contact:	Bill Turner, P.E. (360) 438-0301



"I hereby certify that this Stormwater Drainage Report for the **Black Diamond Housing Project** has been prepared by me or under my supervision and meets minimum standards of **Washington State Department of Ecology Drainage Design and Erosion Control Manual** and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities was designed by me."

Table of Contents

Project Description

MR #1: STORMWATER SITE PLAN
Stormwater Site Plan

Proposed Project Description

Developer:	King County Housing Authority
Contact	Frank Kirkbride 4405 7th Ave. SE Suite 301 Lacey, WA 98507
Site Address:	1st Street Black Diamond, WA
Parcel Numbers:	**084100005**
Total Project Area:	9.35 Acres
Proposed Area This Project	3.2 Acres
Zoned:	R-4
Section, Township, Range:	Section(s) 14 Township 21 North Range 6E, W.M.
Required Permits:	Site Plan Review, Grading Permit, Building Permit

Executive Summary

The King County Housing Authority is continuing with the existing residential project, Rainier View Manufactured Home Park, within the city limits of Black Diamond in King County. This project proposes to construct a minimum of 13 residential modular homes on approximately 3.177 acres that will take access off of 1st in Black Diamond. This project will be completed in phases and begin as soon as approvals for the project have been given by the City of Black Diamond. A Topographic Survey has been completed for this project that identifies all pubic and private development, utilities, infrastructure on and off site as required. This Report will be completed under the WSDOE 2019 Stormwater Manual for Western Washington.

Following the flow charts in the Manual, I-3.1, and I-3.2: "Flow Chart for Determining Requirements for Development and for Redevelopment" it was determined that all nine minimum requirements are required for this project. It was also determined through Section 1-3.2 "Exemptions", indicates that "resurfacing with in kind material without expanding the roadway prism" is exempt from the Minimum Requirements of the Manual except for I-3.4.2 MR #2, Construction Stormwater Pollution & Prevention Plan (SWPPP)". This project will resurface the existing roadway within the development and therefore will not require to construct flow control or a treatment facility for the roadway area.

Baker Street and First Street are local City Street that has already been completed but need improvements and repairs. A portion of First Street will need to be reconstructed along with the curb and gutter and replace the existing 3.5- foot sidewalks with curb, gutter and 5-foot sidewalk on both sides of the roadway. This area of the project is exempt from the minimum requirements according the Washington State Department of Ecology Manual Vol. 1, Section 3.2. This area will not be analyzed in this report.

The roof drains, driveways and lawn are the main concern on this project. Roof drains will be directed to downspouts with splash blocks at the back of the homes. Runoff coming from the roof drains will sheet flow through the grass toward the front of the houses where a sand filter strip will filtrate out the contaminants including the phosphorous which is a major concern on this project.

This project is within a basin that requires phosphorous removal. The Department of Ecology recommends looking at removing phosphorous in a global aspect through a regional treatment facility along with onsite treatment. This is an existing development which was constructed in the 1980's and other than the new homes there will be no new roadway construction on the project site. The removal of phosphorous on this project will be addressed under Minimum Requirement #3 Source Control of Pollutants and #6Runoff Treatment.

Existing Condition
Figure #1

Existing Conditions

This area has already been dev eloped either into homes or landscape for around the homes. This area has more room for thirteen homes to be constructed. Elevation difference on site runs from approximately elevation 650 to elevation 655 in the area where the new homes will be constructed. The site borders the state highway on the east, Baker Street on the west, open ground on the north and south. There are 31 homes already constructed on First and Second Street on the project site. There is a small commons area in the middle of First Street on the west side of the roadway which will remain. There are a few deciduous trees located on the west and east portion of the project site which will probably have to be removed.

Stormwater on the project site is collected through existing catch basins and flows through a conveyance system toward the south where it disperses into a stormwater wetland. There are no steep slopes, ravens, creeks, or rivers on or adjacent to the site. This project does have high ground water but it is not in the 100-year flood plain.

Prepare Preliminary Development Layout

A preliminary development layout has been completed for this project and can be reviewed in the appendix. Figure #1 below is an Existing Condition Photo of the site area which shows the location of existing roadway features and existing homes on site at this time.

Off-site Analysis (at local government's option)

The Geotechnical firm has requested that we don't infiltrate on this project site due to several reasons one being high ground water. This project is a continuation of an earlier development in which the existing roadway and stormwater system was constructed. This development was designed to catch and convey all of the stormwater coming from the roadway and roof areas on site to an existing stormwater wetland at the end of the conveyance system. Treatment, which includes phosphorous removal from the existing impervious surface is through the wetlands located to the northwest of Jones Lake. An off site analysis of the existing system is included. A City stormwater sewer system has already been completed which manages all of the stormwater coming onto the project site at this time. Soil types have been identified throughout the project site and an assessment of the groundwater has been completed. Please see Geotechnical Report in appendix.

Determine Applicable Minimum Requirements

This project will add over 5,000 square feet of imperious surface through the roof area of the additional 13 homes being proposed for the project site. Because this project area is over the 5,000 square foot threshold all Minimum Requirements will be required. Minimum requirements for this site will be for handling all of the roof drains for the new homes that will be construction for this project. Section 3.1 "Roof Downspout Control" in Volume III of the DOE Stormwater Manual, Figure III-3.1.1 "Flow Diagram Showing

Selection of Roof Downspout Controls", (please see appendix for diagram), identifies the minimum requirements for handling stormwater runoff coming from the roof areas on this project.

MR #2: CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

A Construction Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction to address erosion and sediment control anticipated during construction. A Construction NPDES permit will not be obtained prior to construction. The Construction SWPPP will address all twelve elements as required by the City of Black Diamond.

MR #3: SOURCE CONTROL OF POLLUTION

The intent of source control BMP's is to prevent stormwater from coming into contact with pollutants. They are a cost-effective means of reducing pollutants in stormwater, and therefore, should be a first consideration in all projects. This project will be required to address Phosphorus removal coming from the pollution generating surface, which has not yet been identified for this project. In the 2019 Manual, Table III.1.1, "Treatment Trains for Phosphorus Treatment", has several options for phosphorus removal on project that are being newly constructed. Several of those options are not feasible or advisable for this project. Because this project is in an older residential area where street, sidewalks and a stormwater sewer facility have already been constructed, BMP's such as Vegetated Filter Strips, Biofiltration Swales, Linear Sand Filters or Wetvaults are no longer options and are not practical or possible to be installed at this time. The best option for phosphorus removal on this project, with the help and approval of the Department of Ecology, is to retro fit a linear sand filter strip along the back side of the existing sidewalk.

The roof area, according to the 2019 Manual, does not require treatment, but because phosphorous may be generated due to the roof area, it will be treated. The impervious area coming from the new homes on this project are in three separate areas of the site. All of the modular homes being constructed or installed are on 1st Street.

MR #4: PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

There are no natural discharge locations to preserve on this site. There is no indication on the project site where rainfall is flowing through a ditch line, channel, trench, raven, stream or waterway. Rainfall coming onto the site at this time in its natural state is either infiltrated into the ground or is collected by the existing stormwater sewer system located in the city street. This site has not known to have high ground water and the soil has shown very little capacity to infiltrate stormwater runoff. It is the intent of this project to try and mimic the natural state of this site as much as possible.

MR #5: ONSITE STORMWATER MANAGEMENT

Due to the type of soil that existing on the project site, the high ground water and the concerns from the Geotechnical Engineers, this project will not infiltrate the stormwater coming onto the project site The major concern for this project will be the stormwater coming from the roof drains, driveways and lawn areas. The manufactured home that will be placed on this site will be pit set which will be approximately 1.5 to2-feet in depth where perforated foundation drains will be placed to remove any water that should come underneath these homes. The foundation drains will be directed toward a perforated conveyance pipe located on the back of the roadway sidewalk.

The roof drains will be directed to a down spouts at the back side of the homes where it will empty ontp the splash blocks. The splash blocks will allow the runoff to sheet flow through the lawn area down toward the roadway where it will be treated through a linear sand filter. The 2-foot wide by 1-foot deep sand filter will be placed upon a 1-foot layer of gravel drain rock which has an 8-inch perforated drainage pipe. The perforated drainage pipe will be placed at the bottom and in the center of the gravel portion of the trench where it will collect all of the runoff being treated through the sand filter. It will then be convey to a orifice release structure located at the lower end of the linear sand filter system. There will be two linear sand filters on this site, one on each side of the roadway, that will treat and collect all of the runoff from the new homes being install and convey it to a orifice release structure located in front of the side walk on the north end of 1st Street before it's conveyed into the City's stormwater sewer system. A grate will placed at the bottom of the driveway area. This will allow the runoff coming the concrete driveway to flow into the sand filter which will run underneath the concrete surface. Please see plan sheets for details.

There will be three new homes located at the south end of the project site on 1st Street. Runoff in this area flows away from the roadway to the west and down a natural vegetated slope into an undeveloped area. The runoff coming from these three homes will be direct to a conveyance pipe where it will flow into two spreader trenches. The spreader trenches will then allow the runoff to sheet flow down the slope into the undeveloped area.

There will be one home install in the middle of the project site on 1st Street. Runoff from this home will be directed to the downspouts at the back of the house. It will then flow down onto splash blocks that will allow it to sheet flow through on open area located in the back of the homes.

MR #6: Runoff Treatment

This project is a continuation of an earlier development in which the existing roadway, the majority of the homes and stormwater, water and sanitary sewer systems has already been constructed. This project is designed to catch, treat and convey all of the stormwater coming from the proposed building sites along side of the roadway. The WWHM2012 Modeling program and Foroozan Labib with Washington Department of

Ecology, were used to determine the amount of treatment that will be required to treat the stormwater runoff coming from the homes, driveways and law area. Listed below are the parameters that were placed in the modeling program for the two areas, one on each side of the road, for this project.

Table 6.1 WWHM Developed Mitigation Onsite Land Use Summary
West Side of First Street

WWHM Developed Land use (All Areas Measure In Acres)	Ex. Condition	Pr. Site Development	
Sat. Soil Forested State	0.397		
Group C Lawn, Flat	0	0.169	
Roof Tops/Flat	0	0.204	
Driveways/Flot	0	0.024	
Sidwalks/Flat	0	0	
	0		
Total % Impervious (all roof, driveway and parking areas)	**0.0%**	**57%**	

Table 6.1 WWHM Developed Mitigation Onsite Land Use Summary
East Side of First Street

WWHM Developed Land use (All Areas Measure In Acres)	Ex. Condition	Pr. Site Development	
Sat. Soil Forested State	0.317		
Group C Lawn, Flat	0	0.135	
Roof Tops/Flat	0	0.163	
Driveways/Flot	0	0.019	
Sidwalks/Flat	0	0	
	0		
Total % Impervious (all roof, driveway and parking areas)	**0.0%**	**57%**	

The parameters for the linear sand filter, length, depth, width and infiltration rate for the five homes were as follows:

Length = 213’ Width = 2’ Depth = 1’ Infiltration Rate = 2 in/hr

The parameters for the linear sand filter, length, depth, width and infiltration rate for the four homes were as follows:

Length = 207’ Width = 2’ Depth = 1’ Infiltration Rate = 2 in/hr

The result from the modeling program indicates that for the five homes on the west side of the street, 98% of the runoff was treated through the linear sand filter system, including the phosphorous. 100% of the runoff was treated for the four homes on the east side of the street, including the phosphorous. Results of the WWHM2012 Modeling program can be reviews in the appendix. Department of Ecology has indicated that this retrofit “will

comply with their new/redevelopment requirements" in the DOE Manual. Please see appendix for verification.

MR #7: Flow Control

Flow control for this project is provided through two control structures located on 1st Street for the nine homes that will be located along the roadway and a spreader trench for the three homes at the end of 1st Street.

The first control structure will be installed in 1st Street just south of the 1st and Baker Street intersection. A release structure, Type 1L catch basin, with a three orifice control was designed be the Department of Ecologies WWHM2012 Modeling Program. It will connect into the existing culver pipe that crosses 1st Street which is connected to an existing catch basin on Baker Street. The design area for this structure includes the five houses on the west side of the road, all of the driveways for the nine homes on the west and east side of the roadway, and approximately 200-feet of roadway surface and sidewalk. Please see construction drawings for more details.

The second control structure will be installed on the back side of the sidewalk on the east side of 1st Street. It will control the flow through a Type 1 catch basin with a three orifice control structure designed be the Department of Ecologies WWHM2012 Modeling Program. It will only control the flow coming the roof areas from the four homes on the east side of the roadway. Please see the construction drawings for more details.

The last control structure will be a spreader trenches located on the back side of the three homes at the end of 1st Street. All of the roof area, landscaping and driveway surface will flow toward the spreader trench, which is downhill from the homes, from there it will sheet flow down the slope to the south into an undeveloped area. Please see the construction drawing for more details. This will mimic the existing flow path for this area.

MR #8: Wetland Protection

There is no evidence indicating that the discharge coming from the City's stormwater system directly or indirectly enters into a wetland system. We are assuming that the stormwater coming from the City's system infiltrates into the ground at the point of discharge. If this is not the case and the water does go to a wetland system, then please provide us with the required data that will be necessary to evaluate the impact, if any, that would come from install these homes.

MR #9: Operation and Maintenance

The City of Black Diamond is responsible for operation and maintenance of the existing stormwater facility, roadway and sidewalk areas. The King County Housing Authority will maintain the landscaping and lawn area around the new homes being constructed on 1st Street. An Operation and Maintenance Manual will be provided as requested.

Geotechnical Engineering Services

King County Housing Authority
Rainer View Mobile Home Park
Black Diamond, Washington

for
The Kirkbride Group, Inc.

October 26, 2023

GeoEngineers
Earth Science + Technology

Geotechnical Engineering Services

King County Housing Authority
Rainer View Mobile Home Park
Black Diamond, Washington

for
The Kirkbride Group, Inc.

October 26, 2023

GeoEngineers

1101 Fawcett Avenue, Suite 200
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Geotechnical Engineering Services

King County Housing Authority
Rainier View Mobile Home Park
Black Diamond, Washington

File No. 1329-019-01

October 26, 2023

Prepared for:

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Attention: Frank Kirkbride

Prepared by:

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10/26/23

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Associate

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APPENDICES

1.0 INTRODUCTION AND SCOPE OF SERVICES

This report presents the results of our geotechnical investigation and studies performed for King County Housing Authority (KCHA) Rainer View Mobile Home expansion project to be located at 32631 1st Avenue in Black Diamond, Washington (Parcel No. 0841000005). The location of the site and vicinity are shown in the Vicinity Map, Figure 1. The general configuration of the proposed expansion project within the KCHA site is shown in the Site Plan, Figure 2.

Our understanding of this project is based on our discussions with you and members of the project team, including Bill Turner of Turner Consulting Engineers (Civil Engineer) and review of the project Master Plan dated March 8, 2022 (master plan). In addition, we have completed past studies on this project including preparation of a report; "Geologic and Coal Mine Hazard Services Report" dated January 20, 2020 (geologic hazard report) and preparation of a letter; "Infiltration Feasibility Assessment" dated January 29, 2020 (infiltration assessment letter). In this letter, we provided a paper study and our opinion of site soils infiltration potential based on the 2014 Stormwater Management Manual for Western Washington (SMMWW). We have also completed nearby geotechnical studies in 2015 for the Black Diamond Elementary School located at 25314 Baker Street.

The master plan shows the addition of 15 mobile home sites to be constructed within the Rainer View property in areas designated as 1, 2, and 4. The number of homes could change slightly, but not expected to be of significance for the purposes of this report. Most of the site is already in use with mobile homes, roadways, driveways, and established yards. The new sites (15) will be constructed amongst the existing homes and be found at or near surrounding roadway grade. It is expected that the homes will be supported on shallow foundations and/or a pier block type system with a strip footing below; deep foundations are not planned. Most of the sites will require a net export of soil to establish foundation grade.

Stormwater management for the new improvements is designed to be released into the existing city stormwater system with flow control. This is the current design being used for the existing facilities (roads, roofs, sidewalks, etc.) within the project site. The 2019 SMMWW developed by the Washington State Department of Ecology has been designated as the governing stormwater design guideline for this project.

Our services have been provided in general accordance with our proposal signed on September 20, 2023. The scope of our services consists of completing subsurface explorations, obtaining soil samples to verify/modify our infiltration assessments, and to provide general geotechnical criteria as it relates to the proposed design and construction (single family mobile home dwellings). Our specific scope of services can be reviewed in our proposal and can be provided upon request.

2.0 SITE CONDITIONS

2.1. Surface Conditions

We have provided detailed information on site surface conditions in our geologic hazards report and infiltration assessment letter. Based on recent efforts, we conclude that surface conditions as described do not appear different than previously presented.

2.2. Geology Review

We have reviewed our geologic hazards report and infiltration assessment letter while preparing this study. We recommend these reports be reviewed for detailed information on published literature previously reviewed and our assessment and interpretation of subsurface geology. In general, we conclude that our assessments remain unchanged as a result of this study.

2.3. Natural Resources Conservation Service (NRCS) Description

We reviewed the Natural Resources Conservation Service (NRCS) Web Soil Survey (accessed October 21, 2023) which typically describes soil conditions the site is underlain by Beausite Gravelly Sandy loam (BeC), 6 to 15 percent slopes. The literature indicates the parent material to be till over residuum from sandstone. The material is described as well drained with the most limiting layer to transmit water to be moderately high to high. The literature further indicates that soil profile at the immediate surface is a gravelly ashy sandy loam or a very gravelly sandy loam to depths of 38 to 42 inches. Below this depth, the profile lists bedrock as the typical soil type. The literature also describes the depth to water table to be greater than 80 inches.

2.4. Subsurface Conditions

2.4.1. Subsurface Explorations

We explored subsurface conditions at the site by advancing six test pits (TP-1 Through TP-6) on October 11, 2023, at the approximate locations shown in Site Plan, Figure 2. The test pits were advanced to depths of approximately 3½ and 8½ feet below ground surface (bgs). Details regarding our subsurface exploration program are provided in Appendix A. A key to the explorations logs is presented as Figure A-1 and summary logs are presented as Figure A-2 through Figure A-8. TP-4 and TP-4a are shown only as TP-4 in Figure 2. During excavation of TP-4, we observed what appeared to be abandoned steel utility/pipe, subsequently, TP-4a was excavated nearby and subsurface conditions recorded.

2.4.2. Soil Conditions

2.4.2.1. General

We observed what we interpreted to be two general geologic units in our explorations, fill and what we have described in our past studies as Puget Group Sandstone deposits. We did not easily recognize what we would consider glacial till and/or glacial drift deposits that have been reported to be near the area. Explorations were advanced through a layer of grass surfacing underlain by 6 inches of additional sod or silty sand with organic materials and roots. Brief descriptions of each soil unit observed below this 6-inch layer are provided below.

2.4.2.2. Fill

We interpret fill soils, below the 6 inch sod/silty sand layer, to be present at all of the explorations. Fill material was generally described as a silty sand with varying amounts of gravel and some organic matter. The fill, on average, is described as medium dense. The thickness varies between 2½ feet and 7½ feet in the explorations, with greater fill depths reported toward the north portion of the development. We interpret the fill to comprise reworked natural soils, likely placed during initial site development. Based on our explorations and surface conditions, some of the local hummocky terrain near areas 1 and 2 would be indicative of fill placed and stockpiled as a result of past grading.

2.4.2.3. Puget Group Sandstone

The Puget Group Sandstone is described as interbeds of siltstone, shale, claystone, carbonaceous claystone or siltstone and coal beds. We generally describe these materials as silty sand with moderate oxidation staining, and also containing gravel, cobbles, and boulders. Clay seams were noted in some of the explorations. Material generated in blocks of soil containing gravel and cobbles were noted in TP-5 at depth, which we have found common occurrences when excavating in weathered rock sites. We generally interpret the natural soils observed to be the weathered Puget Group Sandstone materials mapped in the project area. Due to the increased density of weathered materials, we were unable to penetrate to an underlying, more in-tact, siltstone. Practical refusal was generally noted in most of the explorations at the depths explored.

2.4.3. Groundwater Conditions

We did not observe groundwater or the presence of seepage in any of our explorations. Groundwater was not reported to depths of at least 18 feet within nearby explorations. Many coal mine hazard areas are present nearby. Review of our summary of these areas indicate mine workings between 80 and 300 feet below the project site. Groundwater was not reported to have been an issue when reviewing these studies. Overall, we expect that static groundwater in the region will be much deeper than excavations required for this project.

We did note occasional soil coloring and iron-oxide staining in many of the explorations, which is an indication of presence of groundwater seepage at various times of the year. We interpret slow to moderate groundwater seepage as well as intermittent shallow seepage could be encountered in some excavations, depending on time of year. It is common for perched groundwater to be present near contacts where soil that is more permeable overlies soil that is less permeable, for example, fill or weathered soil over denser fine-grained silts, weathered and in-tact rock, clay, or even glacial till. The presence of perched groundwater at the site is expected to occur from infiltration of surface water during rain events and is expected to be discontinuous and intermittent. The amount of perched groundwater encountered will vary depending on a variety of conditions including topography, season, irrigation activities, installation of hardscaping, and rainfall events. We anticipate the likelihood for encountering perched groundwater will be lowest during the dryer months of the year, typically between June and September in this region.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1. General

Based on our understanding of the project, the explorations performed for this study and our experience, it is our opinion that the proposed improvements can be constructed generally as envisioned regarding geotechnical considerations. Our recommendations provided are suitable, in our opinion, for general planning and design for near grade single story structures, temporary or permanent, with shallow foundations, or similar.

We strongly recommend that our geologic hazards report also be reviewed and included as a part of final planning and design of Area 4. We have noted the potential presence of mine shafts and/or coal workings below portions Area 4.

A summary of the primary geotechnical considerations for the project is provided below and is followed by our detailed recommendations.

- We anticipate that shallow foundation construction, or similar design, will be adequate for conventional building support for this project. Foundation elements may be established in the existing fill or on native soils. We recommend that a minimum 18-inch-thick base of crushed rock be provided below footings to establish a uniform bearing surface and for protection. This will require overexcavation and import.
- We anticipate perched groundwater may be encountered during site excavations and grading depending on time of year. Intermittent perched groundwater should be able to be adequately managed through the use of sumps, pumps and other shallow groundwater handling techniques typically used in construction.
- The site soils encountered in our explorations contain a significant percentage of fines (material passing the U.S. No. 200 sieve). Soil with a higher fines content, present at this site, is more sensitive to small changes in moisture content and may be difficult, if not impossible, to work and compact during wet weather conditions. This material can also be susceptible to disturbance when wet or if earthwork is performed during wet weather. We do not recommend re-use of on-site soil, except for landscaping purposes, where applicable.
- Due to the composition of on-site soils and based on our sieve analysis in conjunction with the infiltration rate determination procedures outlined in the 2019 SMMWW, we would consider that infiltration into on-site subsurface materials to be, in all practicality, infeasible.

3.2. Seismic Design Considerations

3.2.1. Seismic Design Parameters

In accordance with requirements in the 2018 International Building Code (IBC), we performed a preliminary evaluation of seismic design parameters per American Society of Civil Engineers (ASCE) 7-16. Based on our explorations completed for this study and our experience in areas with similar soil conditions, it is our opinion that the site can be characterized as Site Class D.

Further, per ASCE 7-16 Section 11.4.8, a ground motion hazard analysis is required for structures on Site Class D with S_1 greater than or equal to 0.2. As shown in Table 1 below, S_1 is greater than 0.2 for this site; therefore, this provision applies. Alternatively, per ASCE 7-16 Supplement 3 Section 11.4.8, a ground motion hazard analysis is not required where the value of S_{M1} is increased by 50 percent for all applications of S_{M1} and the resulting value of S_{D1} is used for all applications of S_{D1}. This exception was applied and incorporated in the recommended seismic design parameters provided in Table 1 below. While we do not expect it to be necessary for this project, we can conduct ground motion hazard analysis and provide a site-specific response spectrum, if desired by the design team.

TABLE 1. SEISMIC DESIGN CRITERIA

ASCE 7-16 Parameters[1]	Value
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Period, S_s (g)	1.168
Mapped MCE_R Spectral Response Acceleration at 1-second period, S_1 (g)	0.401
Site Modified Peak Ground Acceleration, PGA_M	0.547

ASCE 7-16 Parameters[1]	Value
Short Period Site Coefficient, F_a	1.033
Long Period Site Coefficient, F_v	1.899
Design Spectral Acceleration at 0.2-second period, S_{DS} (g)	0.804
Design Spectral Acceleration at 1.0-second period, S_{D1} (g)	0.761[2]
Site Modified Earthquake Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.206
Site Modified Considered Earthquake Spectral Response Acceleration at 1-Second Periods, S_{M1} (g)	1.142[2]

Notes:

[1] Parameters developed based on latitude 47.308262 and longitude -122.005855 using the Applied Technology Council (ATC) Hazards online tool (https://hazards.atcouncil.org/).

[2] Per ASCE 7-16 Supplement 3 Section 11.4.8 Item 1, parameter has been increased 50 percent or has increased by 50 percent as a result of the adjusted S_{M1} value.

3.3. Liquefaction, Lateral Spreading, and Surface Rupture

3.3.1. Liquefaction

Liquefaction refers to a condition where vibration or shaking of the ground, usually from earthquake forces, results in development of excess pore pressures in loose, saturated soils and subsequent loss of strength in the deposit of soil so affected. In general, soils that are susceptible to liquefaction include loose to medium dense sands to silty sands that are below the water table.

We reviewed readily available liquefaction susceptibility maps, including the *Liquefaction Susceptibility Map of King County, Washington* (Palmer et al. 2004). According to the reviewed maps, the potential for liquefaction at this site is very low. Based on the soil types and relative densities observed in our explorations and our interpretation of the regional geology and groundwater table, it is also our opinion the potential for liquefaction at this site is very low.

3.3.2. Lateral Spreading Potential

Lateral spreading related to seismic activity typically involves lateral displacement of large, surficial blocks of non-liquefied soil when a layer of underlying soil loses strength during seismic shaking. Lateral spreading usually develops in areas where sloping ground or large grade changes (including retaining walls) are present. Based on our understanding of the proposed improvements and site grading, subsurface conditions, liquefaction risk and current site topography, it is our opinion that the risk of lateral spreading is low.

3.3.3. Surface Rupture Potential

We reviewed geologic reports for the Black Diamond quadrangle (Mullineaux 1970). Surface fault rupture is considered a potential in the Black Diamond area, as the undifferentiated Puget Group sandstone bedrock is broken by many small high angle normal and reverse faults. We describe and present more details on faults in the area within our geologic hazards report. One major fault, the Franklin fault (fault zone) is a strike-slip fault reported to be approximately 2,000 feet south of the site. Another unnamed fault is reported north of our site. Based on the proximity of the site to these mapped faults, lack of detail on fault zones near the site, and the unlikely event that fault ruptures will manifest at the ground surface, it is our opinion the risk to this project because of surface rupture is low.

3.4. Site Development and Earthwork

3.4.1. General

We anticipate site development and earthwork will include clearing and stripping vegetated areas, demolition of existing hardscaping, site grading, establishing subgrades for driveways, parking areas, building foundations, and placing and compacting fill and backfill materials. We expect that the majority of site grading and earthwork can be accomplished with conventional earthmoving equipment. The following sections provide recommendations for stripping, erosion and sedimentation control, excavation, temporary and permanent cut slopes, wet weather considerations, fill materials and fill placement and compaction requirements.

3.4.2. Clearing and Stripping

Based on conditions observed in our explorations, minimum stripping depths at the site will likely be on the order of 6 inches. Greater stripping depths could be required to remove localized zones of loose or organic-rich soil, especially in areas of the site with heavier vegetation. During clearing and stripping, stumps and primary root systems of shrubs and trees should be completely removed. Voids caused by removal of stumps and/or root systems should be backfilled with compacted structural fill. Stripped material should be transported off site or processed and used as fill in landscaping areas.

Based on our explorations, we anticipate that soils exposed will have a high fines content and thus be susceptible to disturbance when wet. Care should be taken to avoid allowing these soils to become saturated and disturbed. We provide recommendations for subgrade protection the “Subgrade Protection and Wet Weather Considerations” of this report.

Cobbles were occasionally encountered in our explorations. Subsurface conditions described in the published site geology would indicate a strong likelihood of encountering cobbles and boulders during excavations at this site. Boulders may be removed from the site or used in landscape areas. Voids caused by boulder removal should be backfilled with structural fill.

Structural elements of existing pavements and/or structures should be demolished and removed from within the footprint of the proposed improvements. During demolition, excessive disturbance of surficial soils may occur, especially if left exposed to wet conditions. Disturbed soils may require additional remediation during construction and grading.

3.4.3. Erosion and Sedimentation Control

Erosion and sedimentation rates and quantities can be influenced by construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. Implementing an erosion and sedimentation control plan will reduce the project impact on erosion-prone areas. The plan should be designed in accordance with applicable city, county and/or state standards. The plan should incorporate basic planning principles, including:

- Scheduling grading and construction to reduce soil exposure.
- Re-vegetating or mulching denuded areas.
- Directing runoff away from exposed soils.
- Reducing the length and steepness of slopes with exposed soils.

- Decreasing runoff velocities.
- Preparing drainage ways and outlets to handle concentrated or increased runoff.
- Confining sediment to the project site.
- Inspecting and maintaining control measures frequently.

Some sloughing and raveling of exposed or disturbed soil on slopes should be expected. We recommend that disturbed soil be restored promptly so that surface runoff does not become channeled.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce erosion and reduce transport of sediment to adjacent areas and receiving waters. Permanent erosion protection should be provided by paving, structure construction or landscape planting.

Until permanent erosion protection is established and the site is stabilized, site monitoring may be required by qualified personnel to evaluate the effectiveness of the erosion control measures and to repair and/or modify them as appropriate. Provision for modifications to the erosion control system based on monitoring observations should be included in the Erosion and Sedimentation Control Plan.

3.4.4. Temporary Excavations and Cut Slopes

Excavations deeper than 4 feet should be shored or laid back at a stable slope if workers are required to enter. Shoring and temporary slope inclinations must conform to the provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring." Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required under Washington Industrial Safety and Health Act (WISHA). The contract documents should specify that the contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety and providing shoring, as required, to protect personnel and structures.

In general, temporary cut slopes should be inclined no steeper than about 1.5H:1V (horizontal to vertical). Steeper slopes, on the order of 1H:1V may be attainable in the dense, undisturbed silts and clays and should be considered on a case-by-case basis with our review. These guidelines assume all surface loads are kept a minimum distance of at least one-half the depth of the cut away from the top of the slope and seepage is not present on the slope face. Flatter cut slopes will be necessary where seepage occurs or if surcharge loads are anticipated. Temporary covering with heavy plastic sheeting should be used to protect these slopes during periods of wet weather.

3.4.5. Permanent Cut and Fill Slopes

We recommend permanent slopes be constructed at a maximum inclination of 2H:1V. Where 2H:1V permanent slopes are not feasible, protective facings and/or retaining structures should be considered. This guideline assumes all surface loads are kept at a minimum distance of at least one-half the height of the slope away from the top of the slope and seepage is not present on the slope face. Flatter cut slopes or additional drainage measures could be necessary where seepage occurs or if surface surcharge loads are anticipated.

To achieve uniform compaction, we recommend that fill slopes be overbuilt and subsequently cut back to expose well-compacted fill. Fill placement on slopes steeper than 5H:1V should be benched into the slope face. The configuration of benches depends on the equipment being used and inclination of the existing

slope. Bench excavations should be level and extend into the slope face at least half the width of the compaction equipment used.

Exposed areas should be re-vegetated as soon as practical to reduce the surface erosion and sloughing. Temporary protection should be used until permanent protection is established.

3.4.6. Temporary Groundwater Handling Considerations

Groundwater handling needs will typically be lower during the late summer and early fall months. Based on our explorations and review of available data in the project area, we do not expect static groundwater to be a significant factor during shallow excavations and earthwork activities. We anticipate shallow perched groundwater can typically be handled adequately with sumps, pumps and/or diversion ditches, as necessary. Perched groundwater at relatively shallow depths is typically surface water that has recently infiltrated or seeped from nearby. Proactive handling of surface water (e.g., grading to reduce ponding) can reduce groundwater handling needs. Ultimately, we recommend the contractor performing the work be made responsible for controlling and collecting groundwater encountered.

3.4.7. Surface Drainage

Surface water should be collected and controlled. Curbs or other appropriate measures such as sloping pavements, sidewalks and landscape areas should be used to direct surface flow away from subgrades, excavations, erosion sensitive areas and from behind retaining structures. Roof and catchment drains should not be connected to wall or foundation drains.

3.4.8. Subgrade Preparation and Evaluation

Subgrades that will support structural fill, structures and/or paving should be thoroughly compacted to a uniformly firm and unyielding condition on completion of stripping and demolition, prior to placing fill or structures. We recommend subgrades be evaluated to identify areas of yielding or soft soil. Evaluation methods such as probing with a steel probe rod or proof-rolling with a heavy piece of wheeled construction equipment are appropriate methods of evaluation.

If soft or otherwise unsuitable subgrade areas are revealed during evaluation that cannot be compacted to a stable and uniformly firm condition, we recommend: (1) the unsuitable soils be scarified (e.g., with a ripper or farmer's disc), aerated and recompacted, if practical; or (2) the unsuitable soils be removed and replaced with compacted structural fill, as needed.

Specific recommendations for bearing surface and pavement subgrade preparation are also provided in this report.

3.4.9. Subgrade Protection and Wet Weather Considerations

The soils encountered in our explorations contain a significant amount of fines and will be susceptible to disturbance during periods of wet weather. Soil with high fines content is very sensitive to small changes in moisture and is susceptible to disturbance from construction traffic when wet or if earthwork is performed during wet weather. If wet weather earthwork is unavoidable, we recommend that the following steps be taken.

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded so that areas of ponded water do not develop. Measures should be taken by the contractor to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Earthwork activities should not take place during periods of heavy precipitation.
- Slopes with exposed soils should be covered with plastic sheeting.
- The contractor should take necessary measures to prevent on-site soils and other soils to be used as fill from becoming wet or unstable. These measures may include the use of plastic sheeting, sumps with pumps and grading. The site soils should not be left uncompacted and exposed to moisture. Sealing the exposed soils by rolling with a smooth-drum roller or other appropriate compaction equipment prior to periods of precipitation will help reduce the extent to which these soils become wet or unstable.
- Construction traffic should be restricted to specific areas of the site, preferably areas that are surfaced with working pad materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practical.
- For this project, we expect a fill material using crushed rock and/or gravel will be most practical. Typically, minimum gravel thicknesses on the order of 12 to 18 inches are necessary to provide adequate subgrade protection for repeated construction traffic. Maintaining the existing asphalt surfacing is also an adequate method of protection; however, asphalt could become distressed and may need repairs depending on the amount of heavy truck traffic. Other options, such as fabrics, asphalt- treated base (ATB), and/or cement treatment can also provide protection, and evaluated on a case-by-case basis.
- Foundation bearing surface protection should also be considered. We provide additional recommendations in the “Shallow Foundations” of this report.

3.5. Fill Materials

3.5.1. Imported Fill Materials

Material used for structural fill should be free of rock fragments larger than 6 inches in maximum dimension, debris, and organics. As the percentage of fines increases, fill materials become increasingly sensitive to changes in moisture. Typically, soil containing more than about 5 percent fines becomes more sensitive to changes in moisture and will become difficult to compact when just a few percent above the optimum moisture content. We recommend project engineers review contractor submittals for earthwork materials prior to use on site.

For this project, we recommend imported soil comprise select granular fill consisting of well-graded sand and gravel or crushed rock with a maximum particle size of 6 inches and less than 5 percent fines by weight based on the minus ¾-inch fraction. Organic matter, debris or other deleterious material should not be present. In our opinion, material with gradation characteristics similar to 2020 Washington State Department of Transportation (WSDOT) Specification 9-03.9 “Aggregates for Ballast and Crushed

Surfacing", or "Gravel Backfill for Walls" approximately the same quality as WSDOT Standard Specification 9-03.12(2).

If prolonged periods of dry weather will prevail during the earthwork phase of the project, materials with a somewhat higher fines content, such as "Select Borrow" or "Gravel Borrow" as described in Section 9-03.14 of the 2020 WSDOT Standard Specifications may be acceptable, as approved by the project engineer.

3.5.2. Quarry Spalls

Where needed, we recommend that quarry spalls consist of 2- to 4-inch washed, crushed stone similar to that described in Section 9-13 of the 2020 WSDOT Standard Specifications. Alternative stone size ranges may be considered, depending on the application.

3.5.3. Recycled Materials

In our opinion, recycled material (such as existing asphalt and concrete) may be considered as fill material on site provided the material is in accordance with 2020 WSDOT Standard Specification 9-03.21 "Recycled Material" and meets requirements for its end use. Ultimately the use of recycled materials should be reviewed and considered by the project engineers. Weather, placement, and location will also be a factor in determining the usefulness of the materials. Recycled asphalt should not be considered for use within building areas or below foundations. The use of recycled asphalt and/or concrete may also need approval for use from the City or other jurisdictional authority.

3.5.4. On-Site Soil

Based on our experience, the silty soils encountered in our explorations are moisture sensitive and will be very difficult or impossible to properly compact when wet. In addition, we expect that existing soils will be excavated at moisture contents above optimum moisture content to achieve adequate compaction. In general, we do not recommend on-site materials be considered for use as a structural fill. Existing site soil could be reserved for use as fill in non-structural areas, as approved by the project engineer.

3.5.5. Topsoil Strippings

Topsoil stripping's may be placed on site provided they are placed in non-structural areas that can tolerate significant long-term total and differential settlements. Settlements of organic-rich soils are highly variable and difficult to quantify. Settlement could continue for several years after construction is completed as the organics break down and decompose. Alternatively, topsoil strippings can be hauled off site.

3.6. Fill Placement and Compaction

3.6.1. General

To obtain proper compaction, fill material should be compacted near optimum moisture content and in uniform horizontal lifts. Lift thickness and compaction procedures will depend on the moisture content and gradation characteristics of the soil and the type of equipment used. The maximum allowable moisture content varies with the soil gradation and should be evaluated during construction. Compaction should be achieved by mechanical means. In general, 12-inch-thick loose lifts are appropriate for steel-drum vibratory roller compaction equipment. During fill and backfill placement, regular testing of in-place density should be conducted to verify adequate compaction is being achieved.

3.6.2. Area Fills and Pavement Bases

Fill placed to raise site grades and materials under pavements and structural areas should be placed on subgrades prepared as previously recommended. Fill material placed below structures and footings must be compacted to at least 95 percent of the theoretical maximum dry density (MDD) per ASTM International (ASTM) D 1557. Fill material placed less than 2 feet below pavement sections must be compacted to at least 95 percent of the MDD. Fill placed deeper than 2 feet below pavement sections must be compacted to at least 90 percent of the MDD. Fill material placed in landscaping areas should be compacted to a firm condition that will support construction equipment, as necessary, typically around 85 to 90 percent of the MDD.

3.6.3. Trench Backfill

For utility excavations, we recommend the initial lift of fill over the pipe be thick enough to reduce the potential for damage during compaction but generally should not be greater than about 18 inches. In addition, rock fragments greater than about 1 inch in maximum dimension should be excluded from this lift.

Trench backfill material placed below structures and footings must be compacted to at least 95 percent of the MDD. In paved areas, trench backfill must be compacted to at least 95 percent of the MDD in the upper 2 feet below subgrade. Fill placed below a depth of 2 feet from subgrade in paved areas must be compacted to at least 90 percent of the MDD. In non-structural areas, trench backfill should be compacted to a firm condition that will support construction equipment as necessary.

3.6.4. Fill in Non-Structural Areas

Areas that will not support buildings or pavements and can tolerate moderate total and differential settlements will not require structural fill. To limit long-term settlements that could affect site drainage, we recommend fill placed in these non-structural areas be compacted to at least 85 to 90 percent of the MDD and generally contain no more than 10 percent organic material by weight.

3.7. Shallow Foundations

3.7.1. Bearing Surface Preparation

Proposed structures can be founded and established on continuous wall, strip, and isolated column footings. To provide uniform bearing support and protection of bearing surfaces and subgrades, we recommend overexcavation below foundations of a minimum of 16- to 18-inches and replacement with a select granular fill or crushed rock. We recommend that foundations not bear directly on existing materials without improvements.

Prepared foundation bearing surfaces should be evaluated by the geotechnical engineer during construction to confirm bearing surfaces have been prepared in accordance with our recommendations. There may also be conditions observed during construction where fill or weathered glacial till soils are relatively dense, avoiding overexcavation and replacement. The geotechnical engineer can help verify and provide additional direction on this during construction.

Footing excavations should be performed using a smooth-edged bucket to limit bearing surface disturbance. The foundation bearing surface must be confirmed or compacted as necessary to a firm, nonyielding condition. Loose, disturbed, or organic-rich materials present at the base of footing excavations

should be removed or compacted as discussed above. If soft or otherwise unsuitable areas are revealed during evaluation that cannot be compacted to a stable and uniformly firm condition the following options may be considered: (1) the exposed soils be moisture conditioned and recompacted; or (2) the unsuitable soils be overexcavated and replaced with compacted structural fill, as needed; or (3) it may be possible to push, seat, and compact quarry spalls into the soft soils to stabilize the surface.

During periods of wet weather, concrete should be placed as soon as practical after preparation of the footing excavations. Foundation bearing surfaces should not be exposed to standing water. If water pools in the base of the excavation, it should be removed before placing structural fill or reinforcing steel. We provided an overexcavation recommendation for design and as such, we expect that this to also prove to be adequate protection for foundation bearing surfaces.

3.7.2. Foundation Design Parameters

3.7.2.1. Minimum Footing Depths and Dimensions

In general, exterior footings should be established at least 18 inches below the lowest adjacent grade. Interior footings should be founded a minimum of 12 inches below the top of the floor slab. Continuous footings should have a minimum width of 18 inches. Isolated column footings should have a minimum width of 24 inches. Mobile home manufacturers may have alternative recommendations for establishing footings or foundation strips. We recommend the bottoms of these elements, where applicable, also be established at least 18 inches below grade.

3.7.2.2. Allowable Soil Bearing Pressure

We recommend an allowable downward soil bearing pressure of 2,500 pounds per square foot (psf) be used for design of footings bearing on 16- to 18- inches of select granular structural fill overlying soil materials. The recommended allowable bearing pressures provided applies to the total of dead and long-term live loads and may be increased by one-third when considering total loads, including earthquake or wind loads. These are net bearing pressures. The weight of the footing and overlying backfill can be ignored in calculating footing sizes. If foundations are located within a distance of about 25 feet from the top of slopes steeper than about 6H:1V, we recommend we be contacted to determine if a reduced allowable soil bearing pressure may be appropriate or to provide alternative recommendations on embedment depths.

3.7.2.3. Foundation Settlement Estimates

We estimate settlement of footings bearing on surfaces prepared as recommend will be less than 1 inch, with differential settlements of less than ½ inch between comparably loaded isolated column footings or along 50 to 100 feet of continuous footing. Settlement is expected to occur rapidly as loads are applied.

3.7.2.4. Lateral Resistance

The ability of the soil to resist lateral loads is a function of frictional resistance, which can develop on the base of footings and slabs and the passive resistance, which can develop on the face of below-grade elements of the structure as these elements tend to move into the soil. For footings founded in accordance with the recommendations presented above, the allowable frictional resistance on the base of the footing may be computed using a coefficient of friction of 0.40 applied to the vertical dead-load forces. The allowable passive resistance on the face of the footing or other embedded foundation elements may be computed using an equivalent fluid density of 250 pounds per cubic foot (pcf) for undisturbed site soils or structural fill extending out from the face of the foundation element a distance at least equal to two and one-half times the depth of the element. These values include a factor of safety of about 1.5.

The passive earth pressure and friction components may be combined provided that the passive component does not exceed two-thirds of the total. The passive earth pressure value is based on the assumptions that the adjacent grade is level and that groundwater remains below the base of the footing throughout the year. The top foot of soil should be neglected when calculating passive lateral earth pressure unless the area adjacent to the foundation is covered with pavement or a slab-on-grade.

3.7.3. Foundation Drains

Based on our interpretation of the regional groundwater table, groundwater seepage conditions observed in our explorations and subsurface soil conditions, it is our opinion footing drains are not necessary to maintain bearing support. However, because of the potential for near-surface seepage during wetter times of the year and potential addition of water from irrigation and landscaping, perimeter footing drains are encouraged to maintain drier conditions around the structure and intercept water that could accumulate below the structure. Typical civil engineering designs with perforated pipes surrounded by gravel and fabrics are usually practical for most of these conditions. We can provide specific recommendations for the design of foundation drains, if requested.

3.8. Slab-on-Grade Floors

We do not anticipate floor slabs, other than typical garage would be needed for this project. Exposed slab subgrades should be evaluated after site grading is complete. In general, we recommend that building slabs be underlain by a minimum of 12-inches of select granular structural fill overlying proof compacted on-site materials.

If necessary, in our opinion, a modulus of subgrade reaction of 200 pounds per cubic inch (pci) can be used for designing a building floor slab, provided the slab subgrade is prepared as recommended. The 12-inch material section recommended can also substitute as a capillary break material, where needed.

We estimate settlement for slabs-on-grade constructed as recommended will be less than ¾ inch for a floor load of 100 psf. We estimate differential settlement of floor slabs will be ½ inch or less over a span of 50 feet for the same loading.

Based on our review of groundwater conditions, it is our opinion an underslab drain system is not necessary. However, if dry slabs are required (e.g., where adhesives are used to anchor carpet or tile to slab), a waterproof liner may be placed as a vapor barrier below the slab.

3.9. Stormwater Infiltration Assessment

Based on the subsurface conditions observed in our explorations, our experience, literature reviewed, and laboratory testing, it is our opinion that stormwater infiltration is generally infeasible for this project. We calculated stormwater infiltration rates using criteria and factors outlined in the 2019 SMMWW, as presented specifically for the sieve analysis methods, in conjunction with the sieve analysis results presented as Figure A-9. Results indicate long term (factored) infiltration rates on the order of 0.03 to 0.28 inches per hour, assuming sands with high silt content. In some instances, clay was also observed in the explorations, which would require adjustments in the factors and produce a lower rate.

We observed relatively consistent subsurface conditions in the explorations completed across this site. Generally, conditions varied somewhat from sandy silts to silty sands with the lowest percentage of fines in samples tested to be on the order of 42 percent, by weight. We envision that underlying soil below our

explorations to become more impermeable as density was observed to increase with depth. We would expect to encounter the Puget Group Sandstone materials below the depths of our explorations which would typically be less permeable than overlying materials tested.

If some smaller or shallower infiltration system are being considered, such as bioswales and permeable pavements, it is our opinion that these types of stormwater infiltration systems will be subject to increased maintenance and pre-mature failure due to the fine-grained nature of these materials at these shallow depths. Accordingly, we do not recommend that permeable pavements, bioswales, and/or infiltration systems be included as part of the proposed improvements for stormwater management.

4.0 LIMITATIONS

We have prepared this report for The Kirkbride Group, Inc. and other members of the design team for the proposed King County Housing Authority project in Black Diamond, Washington. Client may distribute copies of this report to authorized agents and regulatory agencies as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment, and experience. No warranty or other conditions, express or implied, should be understood. The limitations presented in our January 20, 2020 study also apply to this report.

Any electronic form, facsimile, or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to the appendix titled “Report Limitations and Guidelines for Use” for additional information pertaining to use of this report.

FIGURES

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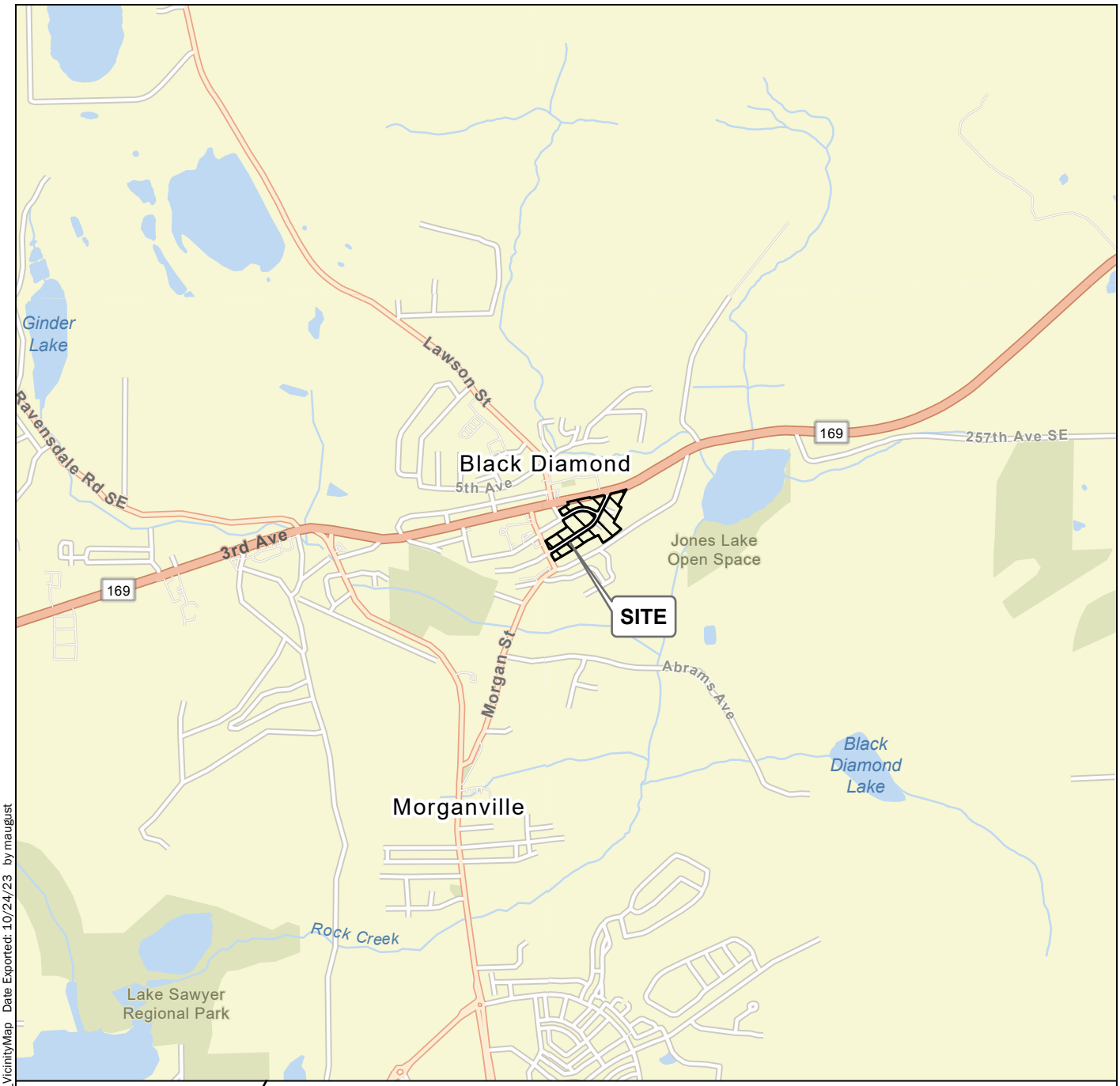

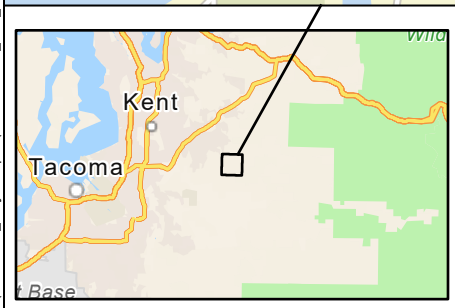

N W E S

2,000 0 2,000

Feet

Vicinity Map

Rainier View Mobile Home Park
Black Diamond, Washington

GeoEngineers

Figure 1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2018

Projection: NAD 1983 UTM Zone 10N

P:\1\1329019\GIS\1329019_Project\1329019_Project.aprx\132901901_F01_VicinityMap Date Exported: 10/24/23 by maugust

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: LiDAR from WA DNR. Parcels and roads from King County GIS. ESRI Clarity image.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- TP-1 — Approximate Location of Test Pit
- Site
- Proposed Expansion Areas
- King County Parcels

N W E S

200 0 200

Feet

Site Plan

Rainier View Mobile Home Park
Black Diamond, Washington

GeoEngineers

Figure 2

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APPENDICES

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APPENDIX A
Subsurface Explorations and Laboratory Testing

APPENDIX A
SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

Subsurface Explorations

Soil and groundwater conditions at the project site were explored by advancing test pits. Approximate locations of the explorations are shown in the Site Plan, Figure 2. Locations were determined in the field using an electronic tablet with global positioning system (GPS) software. Elevations are based on topographic contours included in the provided Construction Document drawings. The locations and elevations of the explorations should be considered approximate.

The explorations were continuously monitored by an engineer from our firm who examined and classified the soil encountered, obtained representative soil samples, maintained a detailed log of the explorations and observed groundwater conditions. Samples were retained in sealed plastic bags to prevent moisture loss. The soils were classified visually in general accordance with ASTM International (ASTM) D 2488 and Figure A-1. Figure A-1 includes a Key to the Exploration Logs.

Test pit excavations were performed using a tracked excavator provided and operated by Kelly's Excavating, Inc. After each test pit was complete the excavation was backfilled using the generated material and compacted using the bucket of the excavator. Summary logs of the test pits are presented as Figures A-2 through A-8. The densities noted on the test pit exploration logs are based on the difficulty of excavation, observations of caving and our experience and judgment.

Laboratory Testing

Soil samples obtained from the explorations were transported to the GeoEngineers laboratory. Representative soil samples were selected for laboratory tests to evaluate the pertinent geotechnical engineering characteristics of the soils and to confirm or modify our field classification. The following paragraphs provide a description of the tests performed.

Moisture Content (MC)

Moisture content of selected samples was determined in general accordance with ASTM Test Method D 2216. The test results are presented on the exploration logs, as indicated for the sample tested.

Percent Fines (%F)

Selected samples were "washed" through the U.S. No. 200 sieve to estimate the relative percentages of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve (fines). Tests were conducted in general accordance with ASTM D 1140. Test results are presented on the exploration logs at the respective sample depths.

Sieve Analysis (SA)

Sieve analyses were performed on selected samples in general accordance with ASTM Test Method D 6913. This test method covers the quantitative determination of the distribution of particle sizes in soils using sieve analysis. Typically, the distribution of particle sizes larger than 75 micrometers (μm) is determined by sieving. Figures A-11 and A-12 present the results of our sieve analyses.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel / Dames & Moore (D&M)

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Date Excavated 10/11/2023	Total Depth (ft) 8	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
			1		SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Dark brown silty fine sand with occasional gravel, organic matter and abundant fine roots (medium dense, moist) (fill)			
	1								
					SM	Brown with some oxidation silty fine sand with gravel and occasional cobbles (medium dense, moist)			
	2		2			Trace boulders, transitions to dense by 2 to 3 feet			Probe 1 to 2 inches at 2 feet Possible presence and increase in clay
	3					Occasional patches of gray			
	4		3						Probe 1 to 2 inches at 4 feet
	5								
	6								
	7								
	8		4 SA		ML	Gray silt with trace fine sand (very stiff, moist)	27	99	Practical refusal encountered at 7.5

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-1

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-2
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 6	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)		Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
	1				SM	Brown to dark brown silty fine to medium sand with gravel, occasional cobbles, some boulders and debris (medium dense, moist) (fill)			
	2		1						Probe 3 to 4 inches at 2 feet
	3		2						
	4				ML	Brown with occasional oxidation staining silty fine sand with gravel and occasional cobbles (dense, moist) (native)			Hard digging at 4 feet
	5								
	6		3						Practical refusal encountered at 6 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-2

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-3
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 4.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)		Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Brown silty fine sand with gravel and cobbles (loose, moist) (fill)			
	1				SM	Gray and brown silty fine sand with gravel and occasional cobbles (dense, moist)			
	2	■	1						Probe 1 to 2 inches at 2 feet
	3								
	4	■	2 SA				14	50	Very tight at 4 feet Practical refusal at 4.5 feet.

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-3

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-4
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 3.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
	1				SM	Grayish brown silty fine to medium sand with gravel, occasional cobbles and trace boulders (medium dense, moist) (fill)			
	2		1		SM	Brown silty fine sand with gravel (dense, moist)			
	3				SM	Brown and gray silty fine sand with occasional gravel (dense, moist)			2-inch steel utility found at 3 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-4

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-5
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 6.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)		Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
	1				SM	Brown silty fine sand with gravel and occasional cobbles (medium dense, moist) (fill)			
	2								
	3				SM	Light brown silty fine sand with gravel and cobbles (dense, moist to near dry)			Hard digging at 3 feet
	4		1						
	5								
	6		2						Practical refusal encountered at 6.5 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-4A

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-6
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 8	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Brown fine to medium sand with gravel, occasional cobbles and trace boulders (medium dense, moist) (fill)			
	1								
	2								
	3		1		SM	Brown and gray with moderate oxidation staining silty fine sand with gravel, occasional cobbles and trace boulders (dense, moist)			Probe 1 to 2 inches at 3 feet Hard digging at 3 feet
	4								
	5		2 SA			Becomes grayish brown	12	4	
	6					Blocks of cobbles and gravels at 6 to 7 feet			
	7		3						
	8		4						Practical refusal encountered at 8 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-5

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-7
Sheet 1 of 1

Date Excavated 10/11/2023	Total Depth (ft) 8.5	Logged By LSP Checked By DJT	Excavator Equipment Takeuchi TB138	Groundwater not observed Caving not observed	
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)		Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SOD/SM	Thin grass layer/ dark brown silty fine sand with occasional gravel and abundant roots (loose, moist) (fill)			
					SM	Dark brown silty fine sand with gravel and occasional cobbles (medium dense, moist) (fill)			
	1								
	2								
	3		1						Probe 2 to 6 inches at 3 feet Concrete pipe at approximately 3 feet
	4								
	5								Steel pipe at approximately 4½ feet
					ML	Light brown sandy silt with gravel (stiff, moist)			
	6		2 SA				13	50	
	7								
	8		3			Becomes dense			

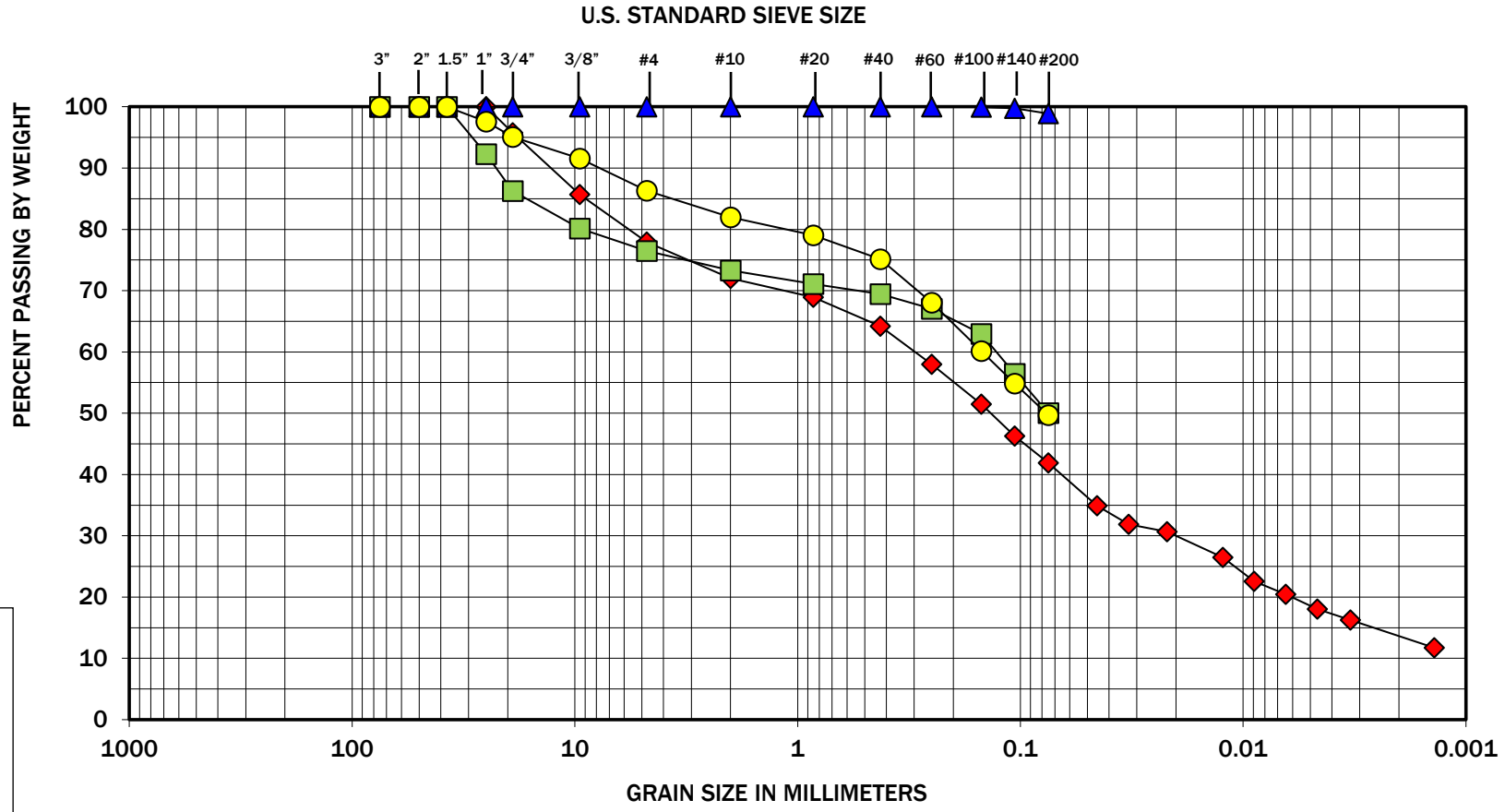
Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Test Pit TP-6

GeoEngineers

Project: Rainier View Mobile Home Park
Project Location: Black Diamond, Washington
Project Number: 1329-019-01

Figure A-8
Sheet 1 of 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-5	5	12	Silty sand with gravel (SM)
■	B-6	6	13	Sandy silt with gravel (ML)
▲	TP-1	7.5	27	Silt (ML)
●	TP-3	4	14	Silty sand (SM)

The grain size analysis results were obtained in general accordance with ASTM D6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

AASHTO ACCREDITED

GeoEngineers

Figure-A-9

Rainer View Mobile Home Park

Black Diamond, Washington

Sieve Analysis Results

APPENDIX B
Report Limitations and Guidelines for Use

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for The Kirkbride Group, Inc. and other members of the design team and for the Project(s) specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our Agreement with The Kirkbride Group, Inc. signed September 20, 2023 and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A Geotechnical Engineering or Geologic Report is based on a Unique Set of Project-Specific Factors

This report has been prepared for the proposed King County Housing Authority Rainier View Mobile Home Park Expansion project in Black Diamond, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;

1 Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Environmental Concerns are Not Covered

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- Advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- Encourages contractors to conduct additional study to obtain the specific types of information they need or prefer.

Contractors are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as

they may relate to this project. The term “Biological Pollutants” includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

Information Provided by Others

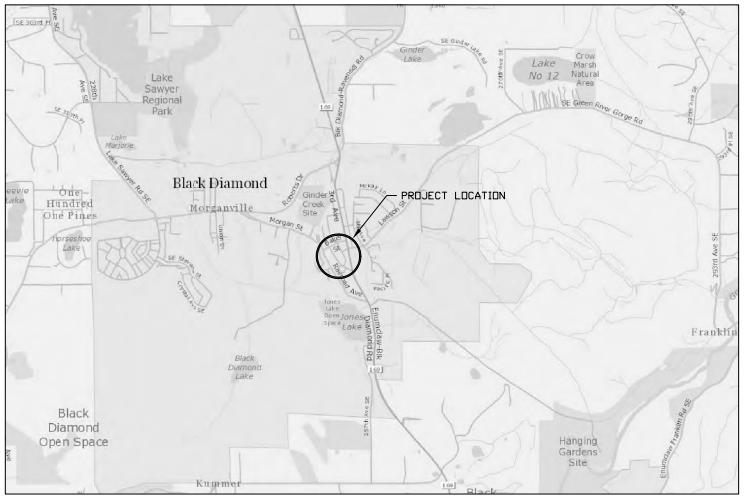
GeoEngineers has relied upon certain data or information provided or compiled by others in the performance of our services. Although we use sources that we reasonably believe to be trustworthy, GeoEngineers cannot warrant or guarantee the accuracy or completeness of information provided or compiled by others.

GeoEngineers

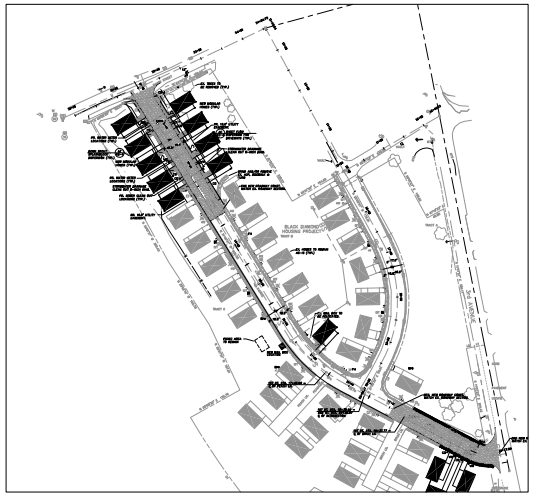
SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK

VICINITY MAP



SITE PLAN



Sheet Index

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4	WS 1 of 1	Water & Sewer Site Plan
5	ST 1 of 2	Street Site Plan
6	SW 1 of 3	Stormwater Site Plan
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9	ST 2 of 2	Intersection Site Plan
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21	GR 1 of 1	Grading & Erosion Control Site Plan
	A1	Mail Box Shelter
	S1.0	Mail Box Notes & Details

APPROVED FOR CONSTRUCTION

_____ DATE: _____

Signed, City Engineer

Approval Expires: _____

LEGEND EXISTING FEATURES

LINE TYPES

- Areas of Fill
- Brush Line
- Building Foot Print
- Bumper Blocks
- Centerline Rail Road
- Centerline Road
- City County State Boundary
- Contours Major
- Contours Minor
- Culverts
- Curb and Gutter
- Ditch
- Drainage Basin
- Easement Lines
- Edge of Concrete Slab
- Edge of Gravel
- Edge of Pavement
- Edge of Sidewalk
- Erosion Control Fence
- Fence
- Fiber Optic
- Gas
- Offsets and Stationing
- Parking Striping
- Pavement Delineation
- Phone – Overhead
- Phone–Buried Phone
- Power – Buried
- Power – Overhead
- Project Boundary
- Property Bearing Lines
- Property Line
- Property Quarter Section Line
- Property Section Line
- Railing
- Retaining Wall
- RW City County Road
- RW Highway
- Set Back Building
- Set Back River
- Set Back Wet Land
- Sewer Line – Gravity
- Sewer Line – Pressure
- Sidewalks
- Stormwater Piping
- Stormwater Treatment Area
- Stream
- Tree Line
- Tree Protection Fence
- Water Line (W (Size))
- Wetland Buffer
- Wetlands

SYMBOLS

- FIRE HYDRANT
- WATER MANHOLE
- WATER VALVE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- POLE ANCHOR
- UTILITY POLE
- GUY POLE
- POWER POLE
- TELEPHONE PEDESTAL
- JUNCTION BOX
- SIGN
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL PEDESTRIAN HEAD
- MAILBOX
- SPOT ELEVATIONS
- TREE (Conifer)
- TREE (Deciduous)

LEGEND PROPOSED FEATURES

LINE TYPES

- Areas of Fill
- Areas of Fill
- Brush Line
- Building Foot Print
- Bumper Blocks
- Centerline Rail Road
- Centerline Road
- Contours Major
- Contours Minor
- Culverts
- Curb and Gutter
- Ditch
- Drainage Basin
- Easement Lines
- Edge of Concrete Slab
- Edge of Gravel
- Edge of Pavement
- Edge of Sidewalk
- Erosion Control Fence
- Fence
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- Parking Striping
- Pavement Delineation
- Phone – Overhead
- Phone–Buried Phone
- Power – Buried
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- Sewer Line – Pressure
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- Stormwater Treatment Area
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- Tree Line
- Tree Protection
- Water Line (W (Size))
- Wetland Buffer
- Wetlands

SYMBOLS

- FIRE HYDRANT
- WATER VALVE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER METER
- POST INDICATOR VALVE
- FIRE DEPARTMENT CONNECT
- DOUBLE CHECK VALVE
- STREET LIGHT ASSEMBLY
- SIGN
- SPOT ELEVATIONS
- TREE (Conifer)
- TREE (Deciduous)

CONTACT INFORMATION

OWNER:	King County Housing Authority
SITE ADDRESS:	1st & 2nd Ave. Black Diamond, WA
ASSESSOR PARCEL NO.:	0841000005
ZONING:	SERVICE COMMERCIAL
TOTAL AREA:	9.35 ACRES
PR. AREA THIS PROJECT:	3.2 ACRES
PR. ROOF & DRIVEWAY AREA:	0.6 ACRES
EX. HOMES:	31
PR. NEW HOMES:	20
SEWER SYSTEM:	City of Black Diamond
WATER:	City of Black Diamond
UTILITIES:	PUGET SOUND ENERGY

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK
INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
NORTHING: 114872.14
EASING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying

FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

DESIGN INFORMATION
PROJECT IDENTIFICATION No.
FILE NAME: BW-COVER SITE PLAN

ACTION		3-18-24
DESIGNED		3-18-24
DRAWN		3-18-24
CHECKED		
PLOTTED	DATES	

REVISION BLOCK:
4th Revision

Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Cover Sheet

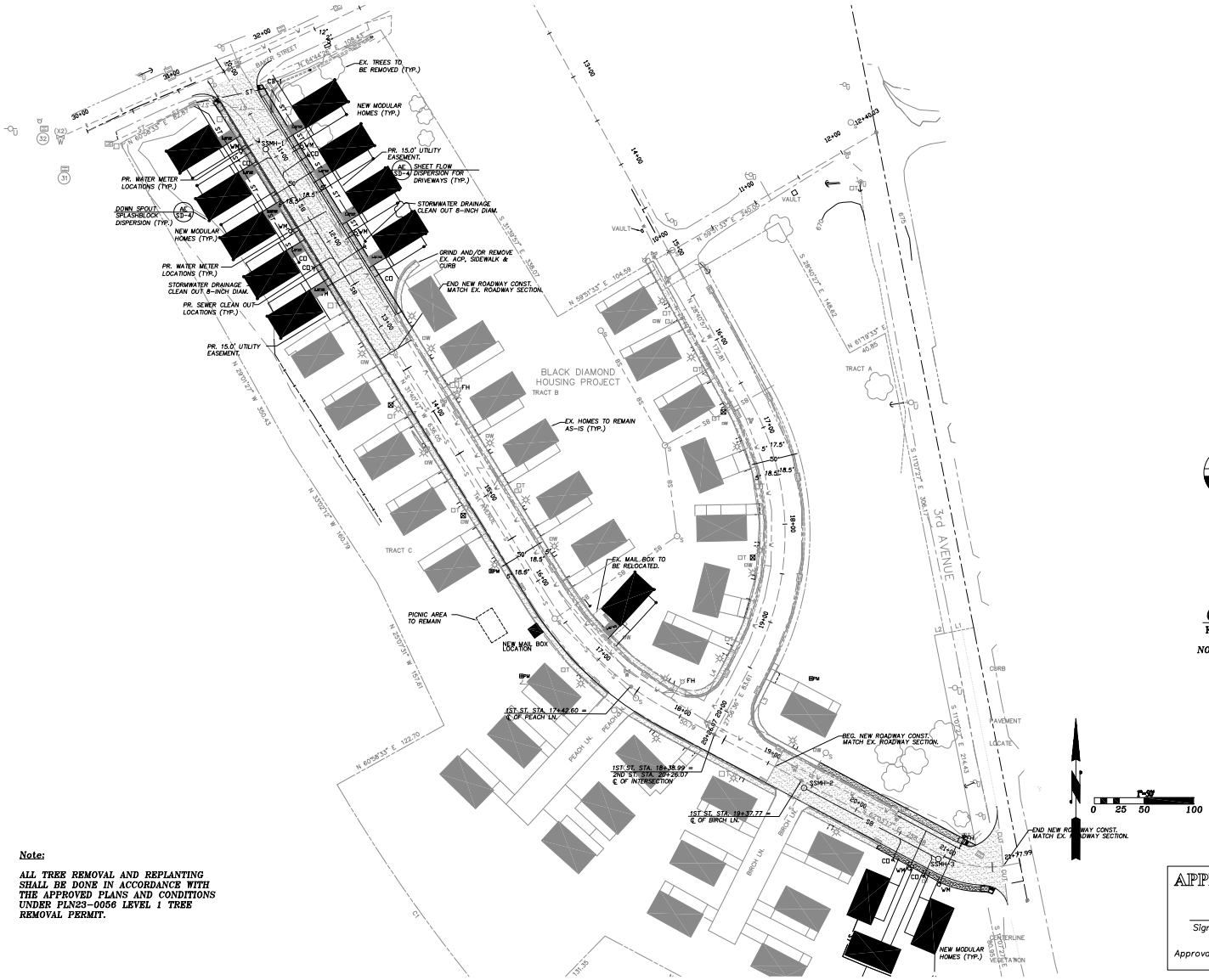
3-18-24

SHEET ID CODE
GE 1 of 2

SHEET No.
1 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



Note:

ALL TREE REMOVAL AND REPLANTING SHALL BE DONE IN ACCORDANCE WITH THE APPROVED PLANS AND CONDITIONS UNDER PLN23-0056 LEVEL 1 TREE REMOVAL PERMIT.

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

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Signed, City Engineer

Approval Expires: _____

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ACTION		3-18-24
DESIGNED		3-18-24
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PLOTTED DATES		

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360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
General Site Plan

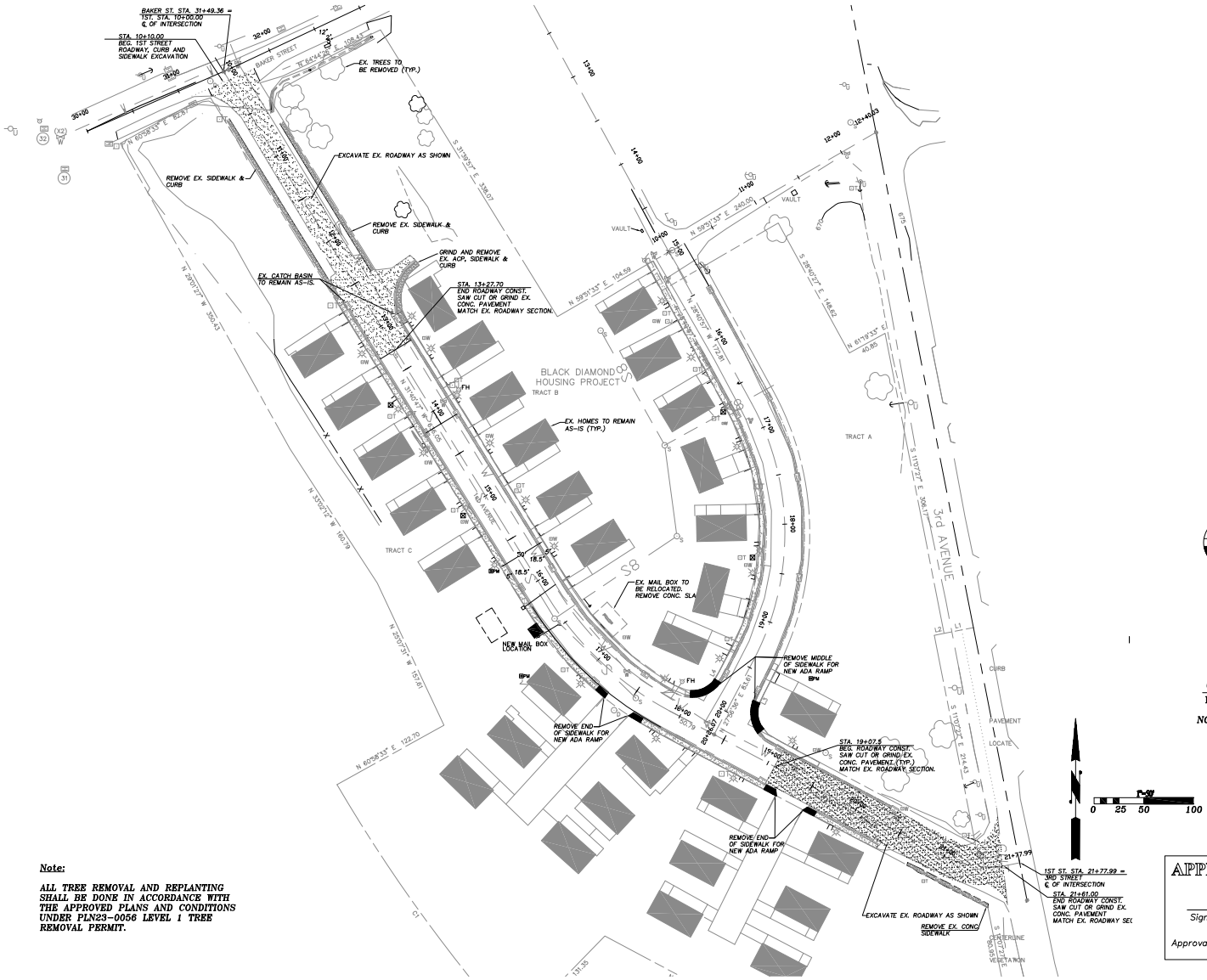
3-18-24

SHEET ID CODE
GE 2 of 2

SHEET No.
2 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



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VERTICAL DATUM
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WASHINGTON STATE PLANE COORDINATES NORTH ZONE

BENCHMARK

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360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View
Manufactured Home Park
Removal & Relocation Site Plan

3-18-24

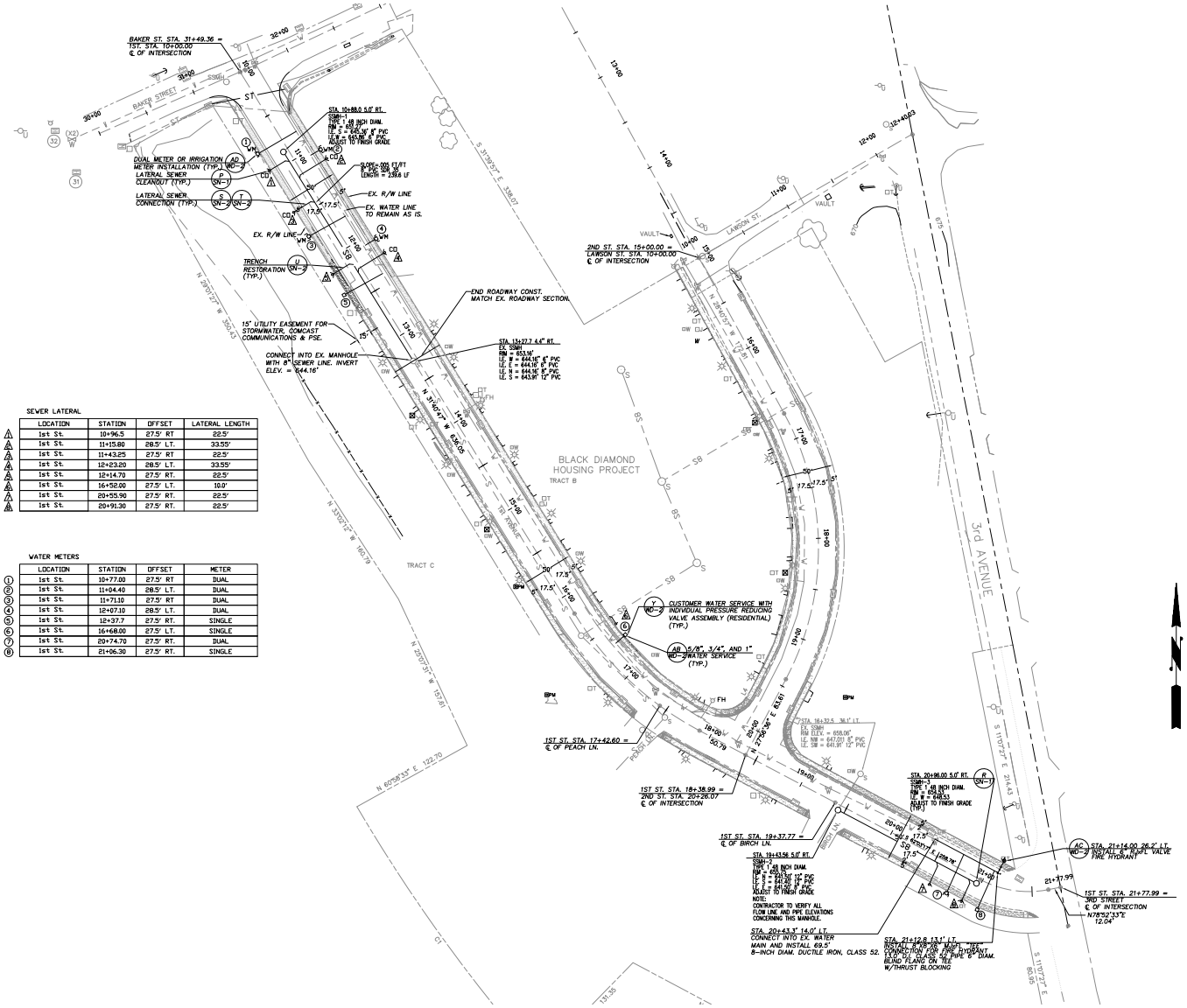
SHEET ID CODE
RS 1 of 1

SHEET No.
3 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK

VICINITY MAP



SEWER LATERAL

	LOCATION	STATION	OFFSET	LATERAL LENGTH
A	1st St.	10+96.5	27.5' RT	22.5'
A	1st St.	11+15.80	28.5' LT.	33.55'
A	1st St.	11+43.25	27.5' RT	22.5'
A	1st St.	12+23.20	28.5' LT.	33.55'
A	1st St.	12+14.70	27.5' RT.	22.5'
A	1st St.	16+52.00	27.5' LT.	10.0'
A	1st St.	20+55.90	27.5' RT.	22.5'
A	1st St.	20+91.30	27.5' RT.	22.5'

WATER METERS

	LOCATION	STATION	OFFSET	METER
①	1st St.	10+77.00	27.5' RT	DUAL
②	1st St.	11+04.40	28.5' LT.	DUAL
③	1st St.	11+71.10	27.5' RT	DUAL
④	1st St.	12+07.10	28.5' LT.	DUAL
⑤	1st St.	12+37.7	27.5' RT.	SINGLE
⑥	1st St.	16+68.00	27.5' LT.	SINGLE
⑦	1st St.	20+74.70	27.5' RT.	DUAL
⑧	1st St.	21+06.30	27.5' RT.	SINGLE

0 25 50 100

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK
INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
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EASTING: 1349492.01
ELEV.: 650.43

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FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION
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FILE NAME: BW-COVER SITE PLAN

ACTION		3-18-24
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DRAWN		3-18-24
CHECKED		3-18-24
PLOTTED DATES		

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4th Revision

Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Water & Sewer Site Plan

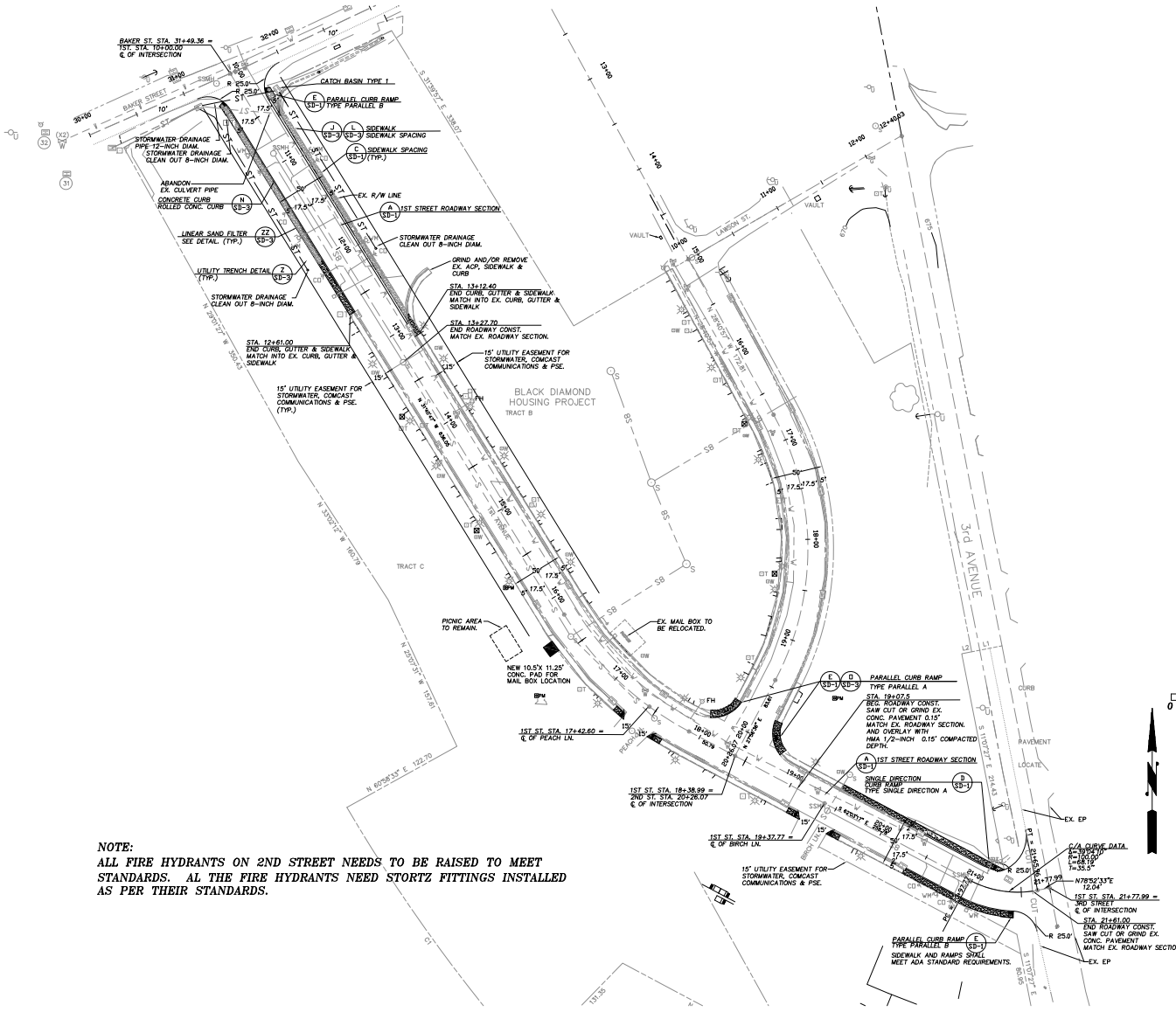
3-18-24

SHEET ID CODE
WS 1 of 1

SHEET No.
4 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



NOTE:
ALL FIRE HYDRANTS ON 2ND STREET NEEDS TO BE RAISED TO MEET STANDARDS. AL THE FIRE HYDRANTS NEED STORTZ FITTINGS INSTALLED AS PER THEIR STANDARDS.

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST.
MONUMENT IN CASE
NORTHING: 114872.14
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APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

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PLOTTED DATES		

REVISION BLOCK:
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Turner Engineering
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Street Site Plan

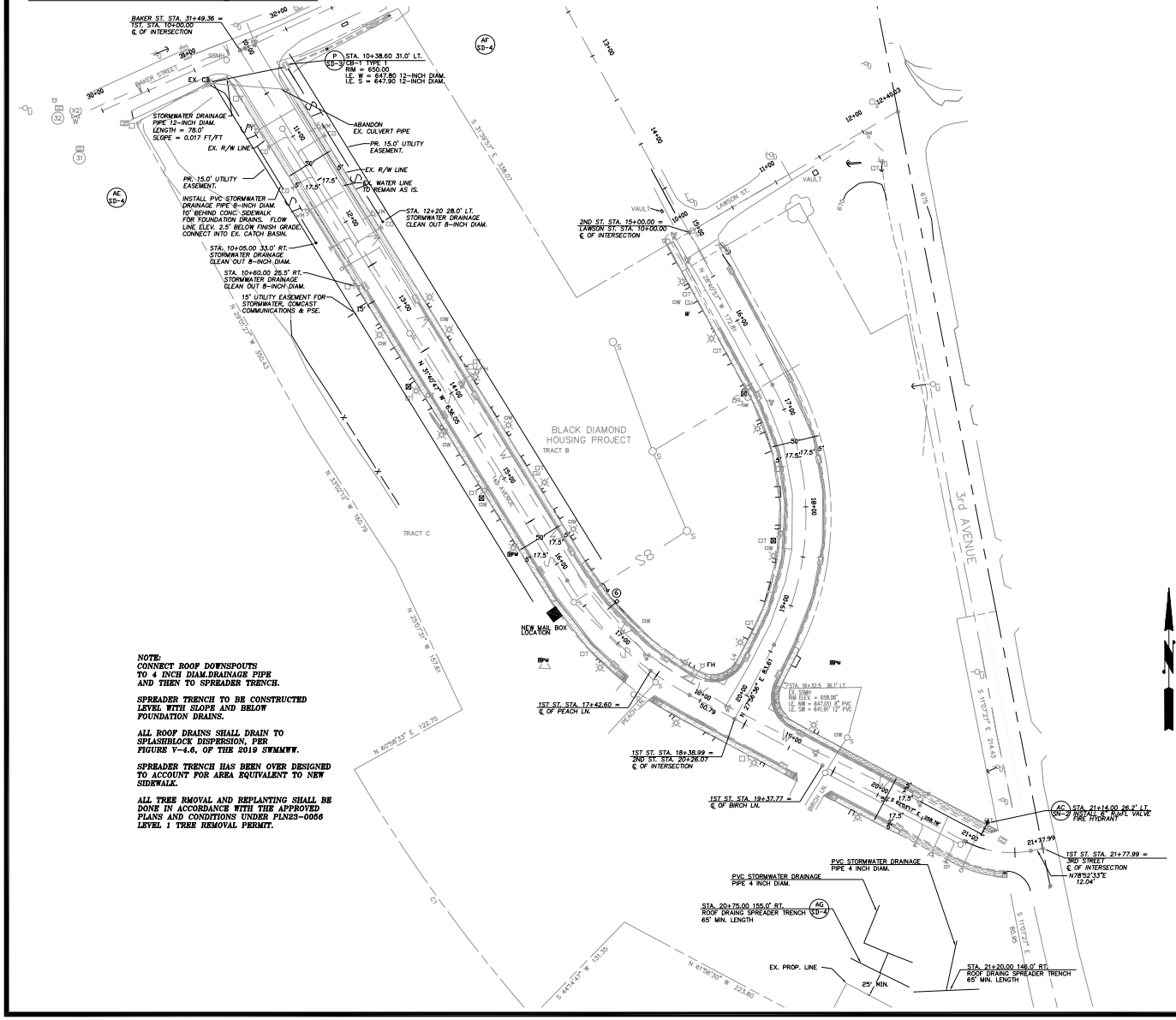
3-18-24

SHEET ID CODE
ST 1 of 2

SHEET No.
5 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



NOTE:
CONNECT ROOF DOWNSPOUTS TO 4 INCH DIAM.DRAINAGE PIPE AND THEN TO SPREADER TRENCH.

SPREADER TRENCH TO BE CONSTRUCTED LEVEL WITH SLOPE AND BELOW FOUNDATION DRAINS.

ALL ROOF DRAINS SHALL DRAIN TO SPLASHBLOCK DISPERSION, PER FIGURE V-4.6, OF THE 2019 SWMMWW.

SPREADER TRENCH HAS BEEN OVER DESIGNED TO ACCOUNT FOR AREA EQUIVALENT TO NEW SIDEWALK.

ALL TREE RMOVAL AND REPLANTING SHALL BE DONE IN ACCORDANCE WITH THE APPROVED PLANS AND CONDITIONS UNDER PLN23-0056 LEVEL 1 TREE REMOVAL PERMIT.

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DRAWN		3-18-24
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REVISION BLOCK:
4th Revision

Turner Engineering
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Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Stormwater Site Plan

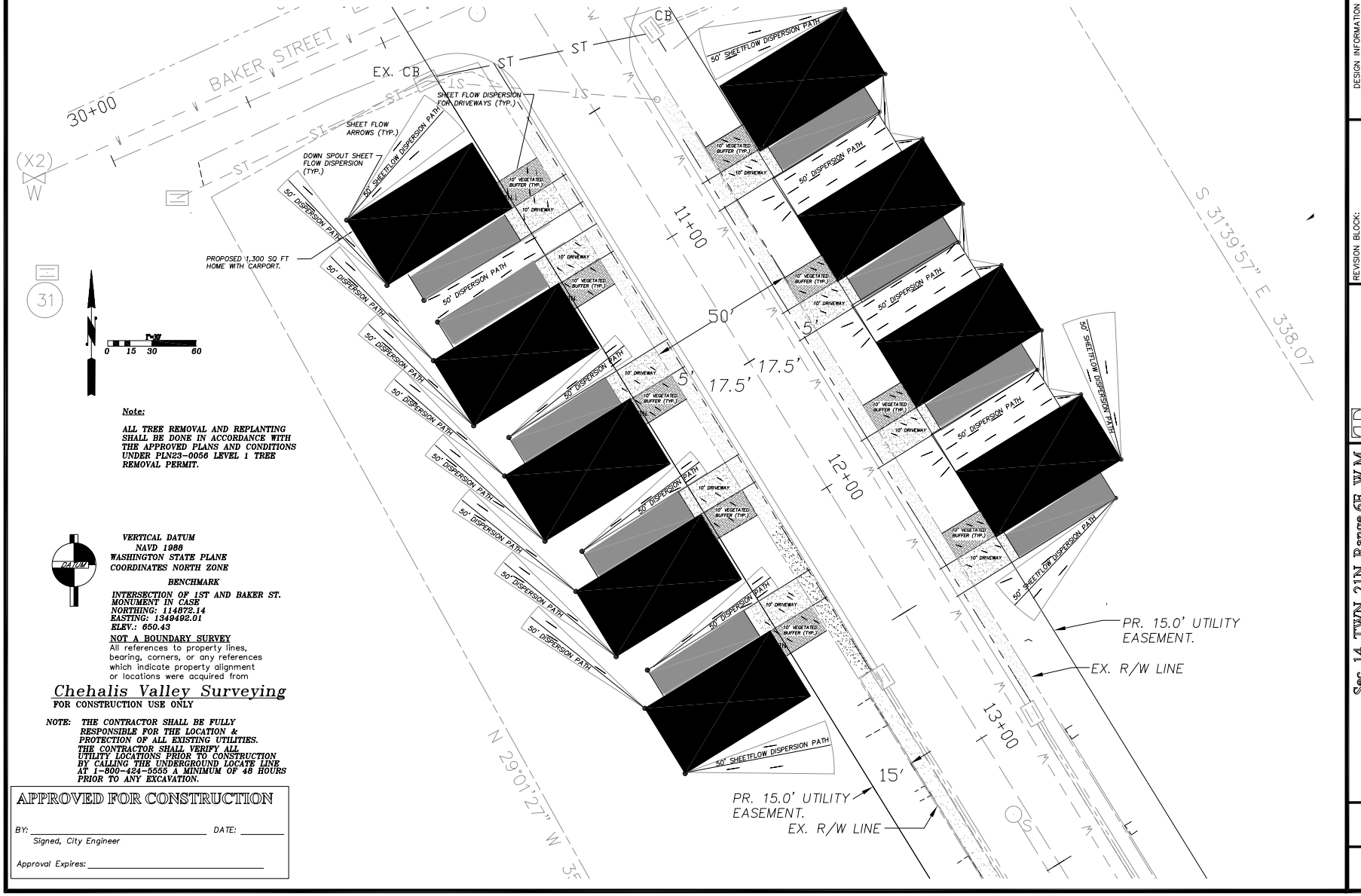
3-18-24

SHEET ID CODE
SW 1 of 1

SHEET No.
6 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



Note:

ALL TREE REMOVAL AND REPLANTING SHALL BE DONE IN ACCORDANCE WITH THE APPROVED PLANS AND CONDITIONS UNDER PLN23-0056 LEVEL 1 TREE REMOVAL PERMIT.

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST. MONUMENT IN CASE
NORTHING: 114872.14
EASTING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying
FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION		
PROJECT IDENTIFICATION No.		
FILE NAME: BW-COVER SITE PLAN		
ACTION		3-18-24
DESIGNED		3-18-24
DRAWN		3-18-24
CHECKED		3-18-24
PLOTTED DATES		

REVISION BLOCK: 4th Revision

Turner Engineering
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Stormwater Treatment Plan

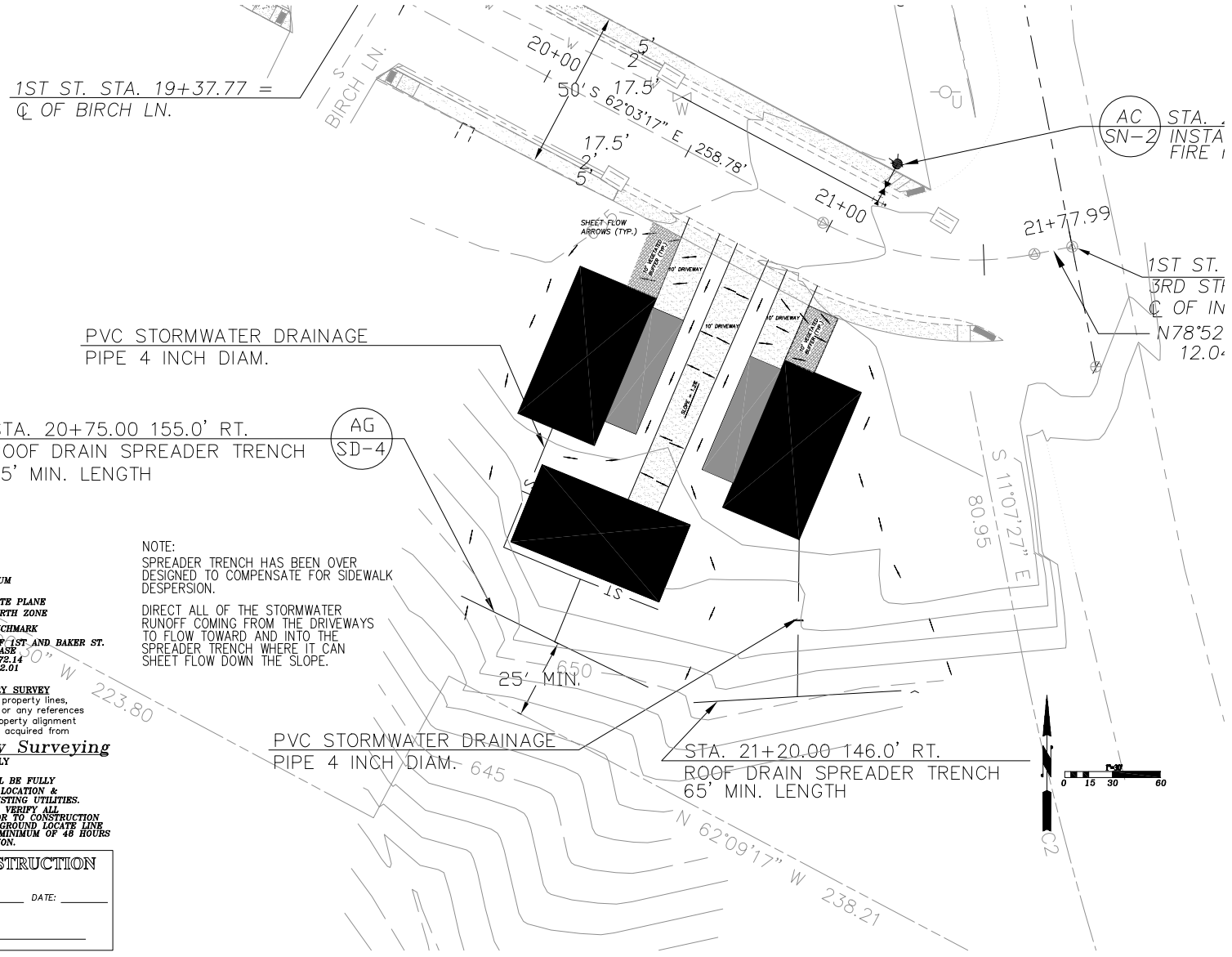
3-18-24

SHEET ID CODE
SW 2 of 3

SHEET No.
7 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



DATUM

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4th Revision

Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Stormwater Treatment Plan

3-18-24

SHEET ID CODE
SW 3 of 3

SHEET No.
8 of 21

SEC. 14, TWN. 21N, RNG 6E, W.M.

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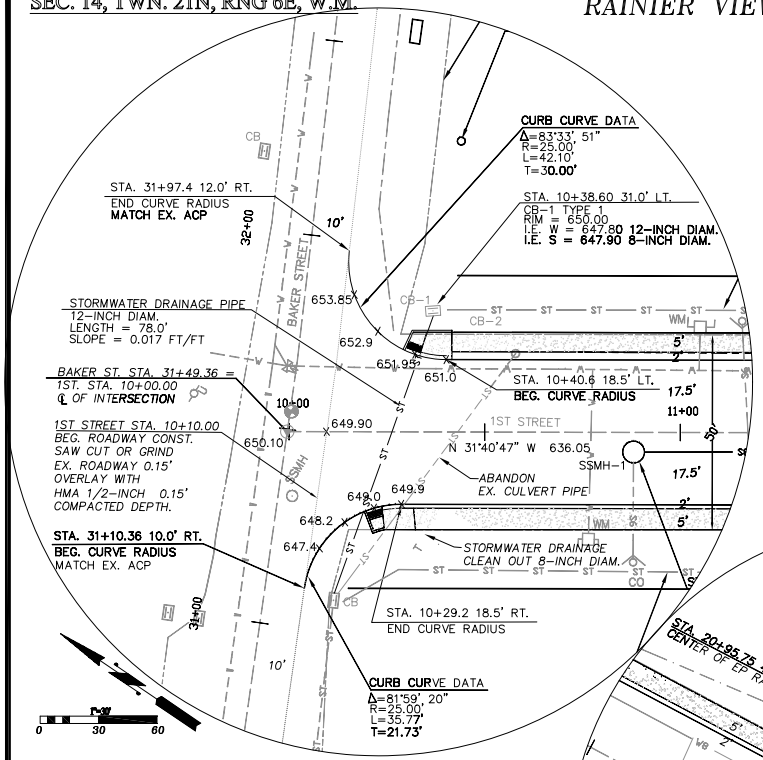
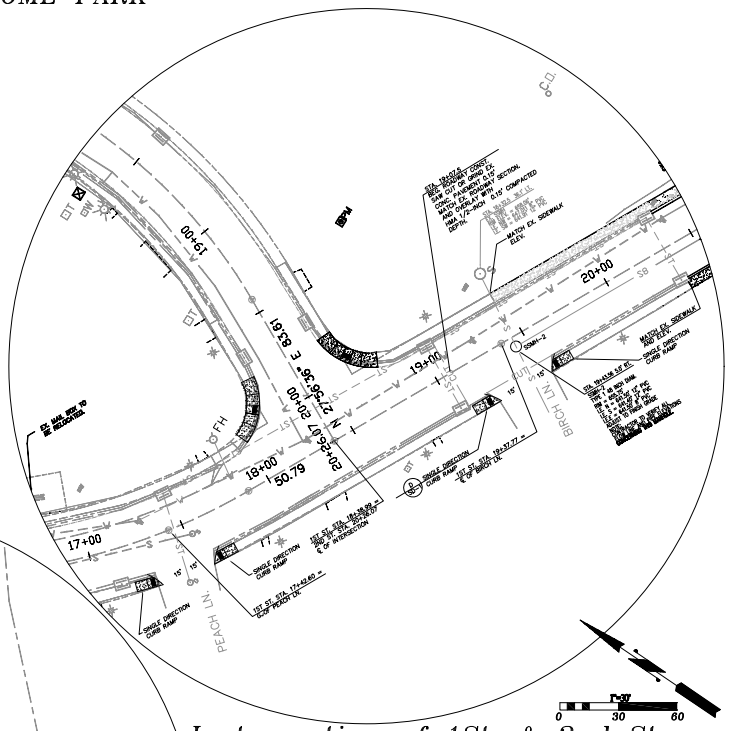
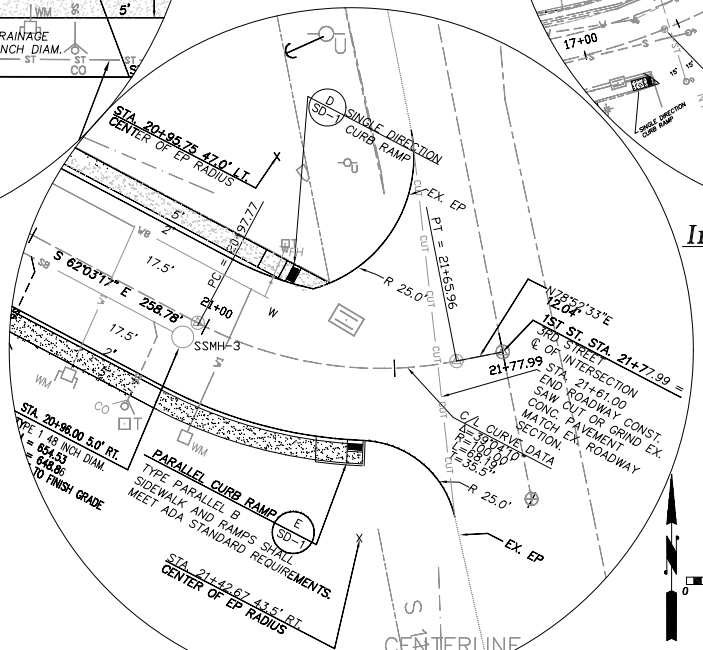


Instersection of Baker & 1st St.



Instersection of 1St. & 2nd St.



Instersection of 1st & 3rd Avenue

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COORDINATES NORTH ZONE

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4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Intersection Site Plan

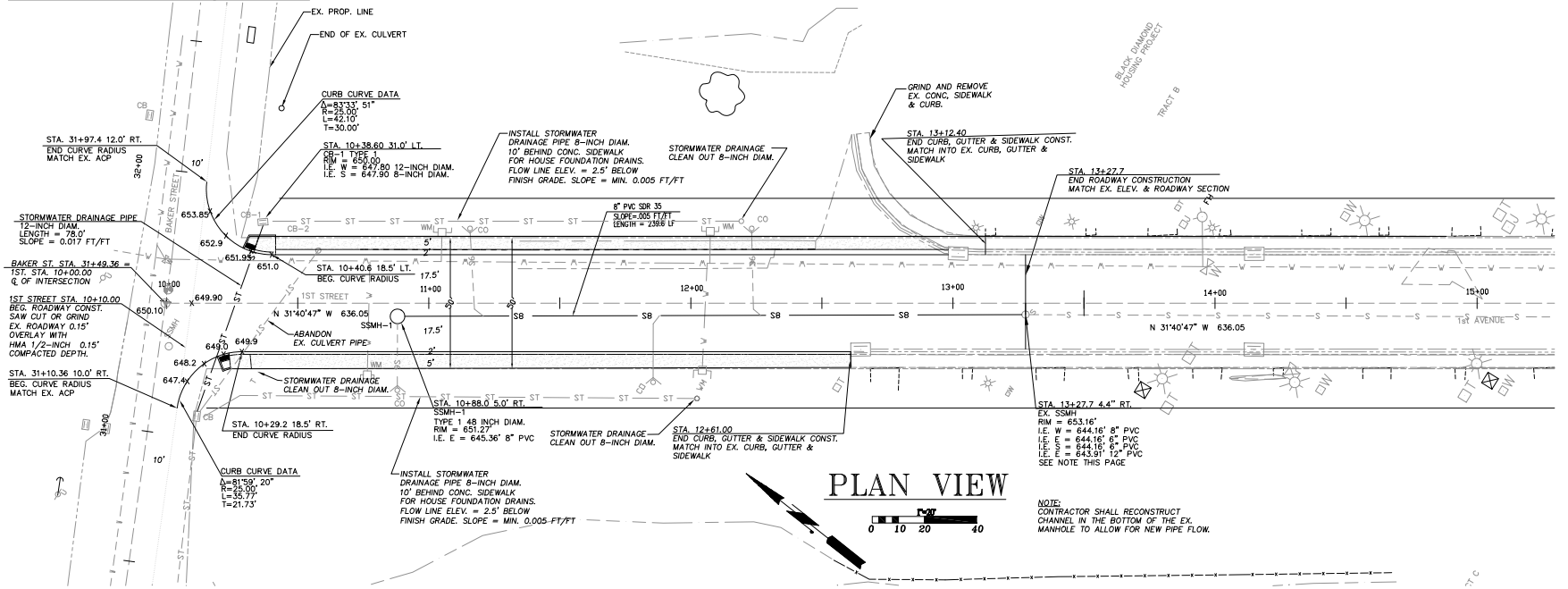
3-18-24

SHEET ID CODE
ST 2 of 2

SHEET No.
9 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

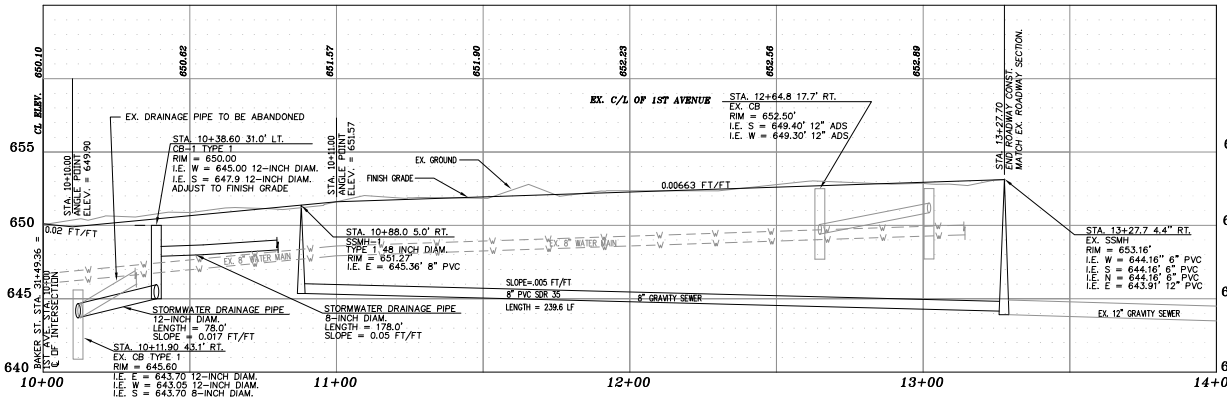
RAINIER VIEW MANUFACTURED HOME PARK



PLAN VIEW

0 10 20 40

NOTE: CONTRACTOR SHALL RECONSTRUCT CHANNEL IN THE BOTTOM OF THE EX. MANHOLE TO ALLOW FOR NEW PIPE FLOW.



PROFILE VIEW

HORIZONTAL SCALE: 0 10 20 40 SCALE IN FEET

VERTICAL SCALE: 0 2 4 8 SCALE IN FEET

NOTE: ALL STORM DRAIN PIPES FROM THE LOTS SHALL BE PRIVATELY OWNED AND MAINTAINED.

VERTICAL DATUM
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T Turner Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Rainier View
Manufactured Home Park
Street, Sewer & Stormwater
Plan & Profile

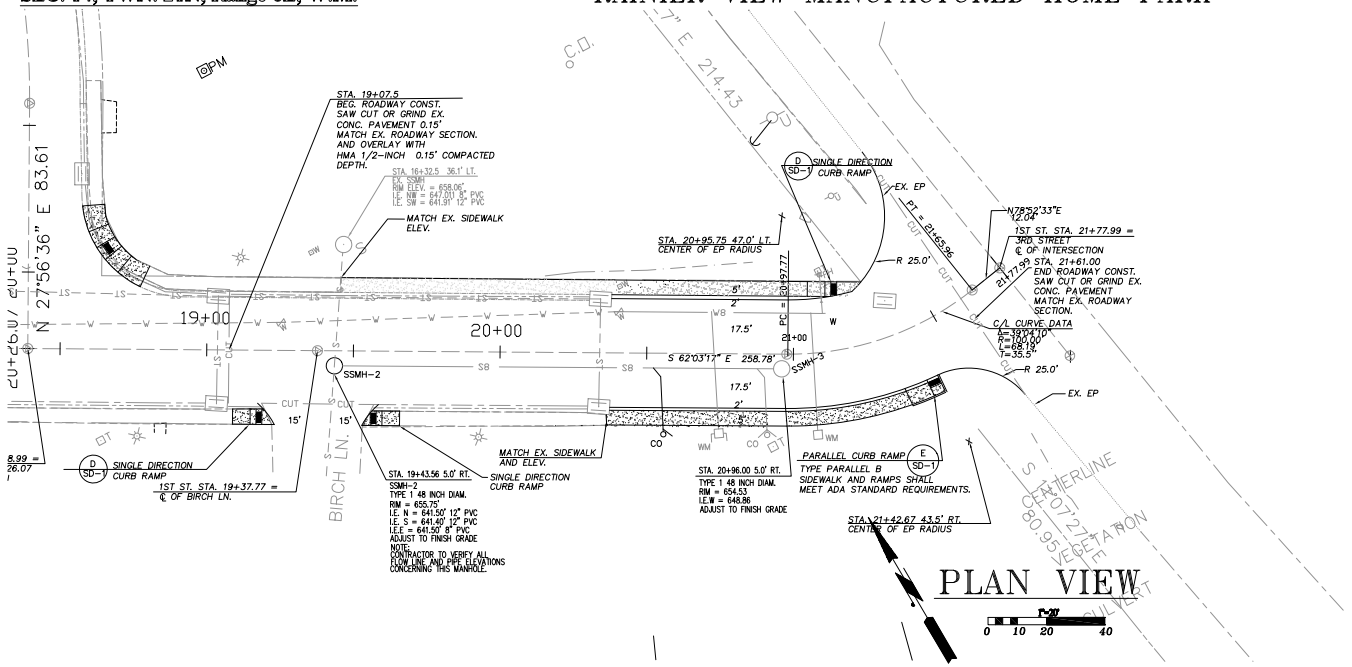
3-18-24

SHEET ID CODE
PP 1 of 3

SHEET No.
10 of 21

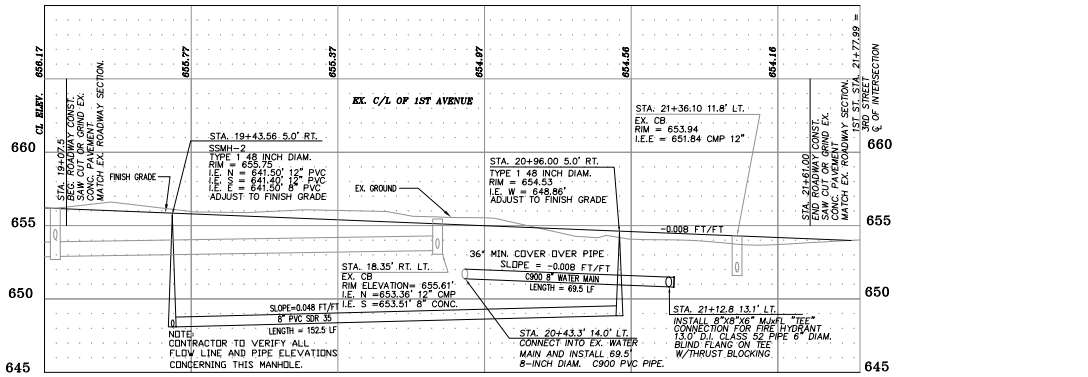
SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



PLAN VIEW

HORIZONTAL SCALE: 1"=20'
0 10 20 40
SCALE IN FEET



PROFILE VIEW

VERTICAL SCALE: 1"=4'
0 2 4 8
SCALE IN FEET

NOTE: ALL STORM DRAIN PIPES FROM THE LOTS SHALL BE PRIVATELY OWNED AND MAINTAINED.

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T Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Rainier View Manufactured Home Park
Street, Sewer & Stormwater
Plan & Profile

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SHEET ID CODE
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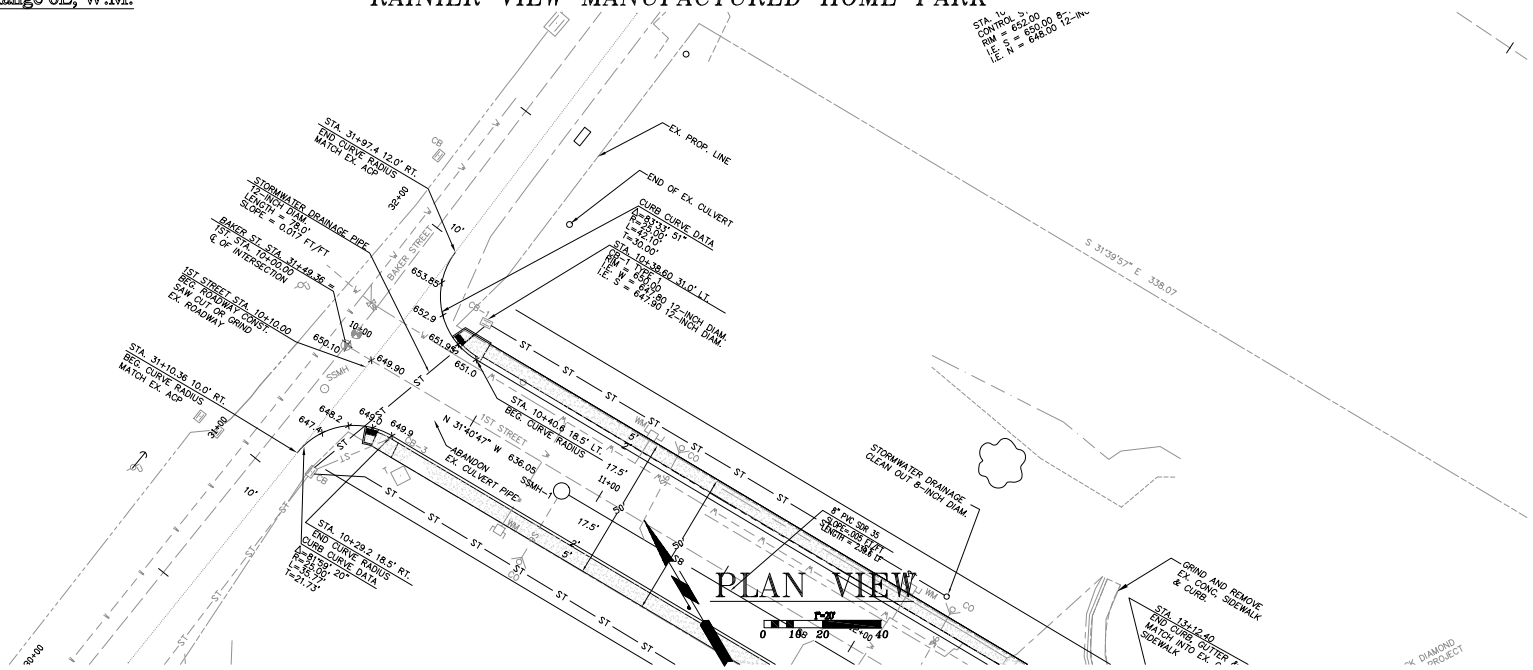
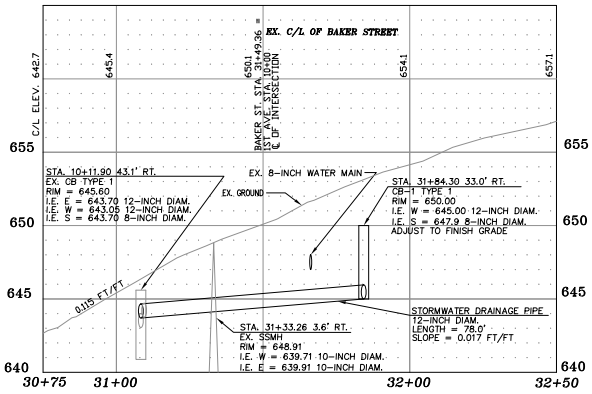
11 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK





PROFILE VIEW

HORIZONTAL SCALE: 0 10 20 40 SCALE IN FEET

VERTICAL SCALE: 0 2 4 8 SCALE IN FEET

NOTE: ALL STORM DRAIN PIPES FROM THE LOTS SHALL BE PRIVATELY OWNED AND MAINTAINED.

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4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Rainier View Manufactured Home Park
Street, Sewer & Stormwater
Plan & Profile

3-18-24

SHEET ID CODE PP 3 of 3

SHEET No. 12 of 21

Streets General Notes:

1 All workmanship and materials will be in accordance with the current City of Black Diamond Standards and the most current edition of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction.

2 The contractor will be responsible for all traffic control in accordance with U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD). Prior to disruption of any traffic, traffic control plans will be prepared and submitted to the City for approval. No work will commence until all approved traffic control is in place. Work shall cease when traffic control fails to meet minimum requirements.

3 All curb, curb and gutter, street grades, sidewalk grades, and any other vertical and/or horizontal alignment will be staked by a licensed engineering or surveying firm capable of performing such work.

4 Where new asphalt joins existing, the existing aswith the standard specifications. The new asphalt will be feathered back over existing asphalt to provide for a seal at the saw cut location and the joint sealed with Grade AR-4000W paving asphalt. A sand blanket shall be applied to the surface to minimize 'tracking' of same.

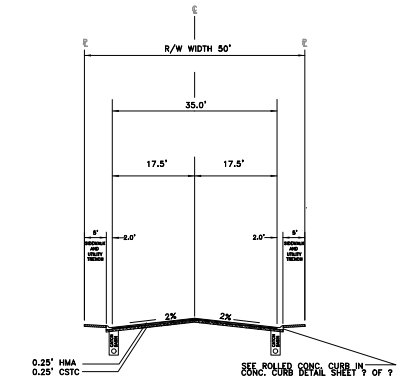
5 All local access streets shall require sawcut and sealing of all joints.

6 All arterials and collectors shall require tapered grinding/inlay for all joints

7 Compaction of subgrade, rock, and asphalt will be in accordance with the WSDOT standard specifications.

8 Form and subgrade inspection by the City is required before pouring concrete. A minimum twenty-four hours notice is required to be provided to the City for form inspection.

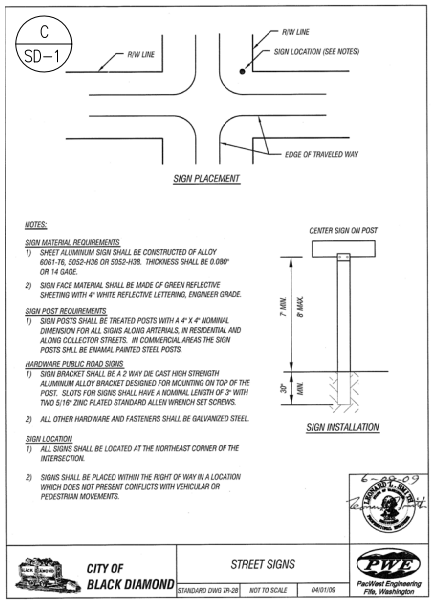
9 Testing and sampling frequencies will be as described in Section 3.3.12.



1ST STREET ROADWAY SECTION

STA. 10+10.00 TO STA. 13+27.70
STA. 20+37.70 TO STA. 21+55.30

A SD-1



Special Provisions:

Removal of Structures and Obstructions:

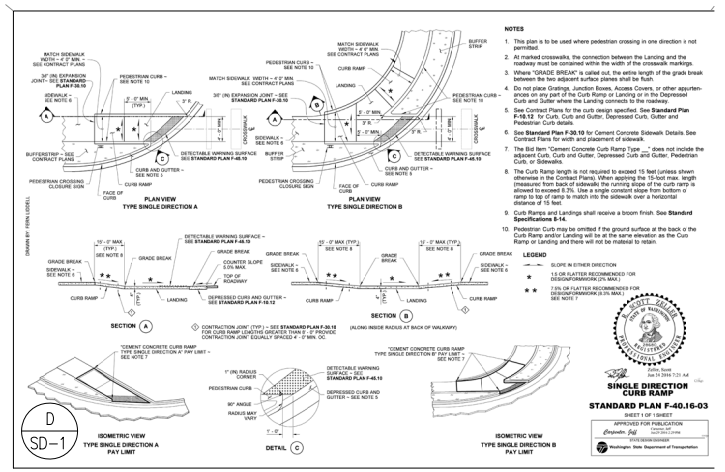
The Contractor shall remove or abandon existing stormwater culvert pipe located at STA.10+44.00, near the intersection of Baker and 1st Street. If Contractor chooses to abandon existing culvert pipe, pipe will be back filled with lean concrete or as approved by the Engineer.

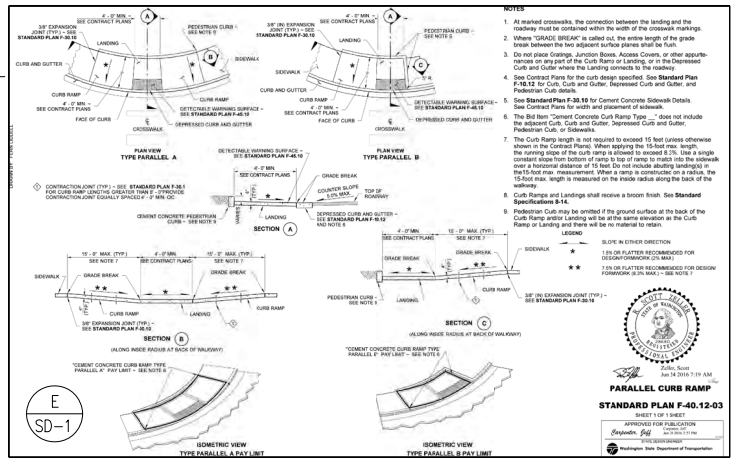
Grinding Bituminous Pavement:

Contractor shall remove or grind 0.15' of bituminous pavement as shown in the plans or as directed by the Engineer.

Remove and Relocate Exiting Mailbox Stand

The Contractor shall remove existing mailbox stand and concrete pad and dispose of off site. Contractor shall contact US Postal Service to determine exact location for the new mailbox stand along with construction requirements.





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Turner Consulting Engineer
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View

Manufactured Home Park

Street General Notes & Details

3-18-24

SHEET ID CODE
SD 1 of 4

SHEET No.
13 of 21

Storm Drainage General Notes:

1. All work shall conform to City of Black Diamond Standards, the Stormwater Management Manual for Western Washington by the Department of Ecology, and the WSDOT Standard Specifications.

2. Temporary erosion / water pollution measures shall be required in accordance with the Stormwater Management Manual for Western Washington by the Department of Ecology and as follows:
   a. Soil erosion and water pollution/flood control plans shall be submitted to the City, approved by the City, and implemented by the contractor prior to disturbing any soil on the site. Submittal and approval of these plans shall preclude any construction activity on the site.
   b. All permanent storage and retention/detention areas used as part of the temporary erosion control and water pollution / flood activities and conveyance system shall be cleaned of all silts, sand, and other materials following completion of construction and the permanent facilities shall then be completed including permanent infiltration areas. If an infiltration pond is to be used on a temporary basis for a sediment control pond, a protective layer of fine soil as determined by an engineer shall be installed in order to protect the infiltrative capacity of the ultimate underlying soil

3 Compliance with all other permits and other requirements by the City of Black Diamond and/or other governing authorities shall be required.

4 A preconstruction meeting shall be held with the City prior to the start of construction.

5 All storm mains and retention/detention areas shall be staked for grade and alignment by an engineering or surveying firm capable of performing such work, and currently licensed in the State of Washington to do so.

6 Storm drain pipe shall meet the following requirements:

   a. Polyvinyl Chloride: PVC pipe shall conform to ASTM D 3034, SDR 35 or ASTM F 789 with joints and rubber gaskets conforming to ASTM D3212 and ASTM F4777.
   b. Plain Concrete: Plain concrete pipe per WSDOT Standard Specifications.
   c. Reinforced Concrete: Reinforced concrete pipe per WSDOT Standard Specifications.
   d. Ductile Iron: Ductile iron pipe shall conform to AWWA C151 Class 50 and have a cement mortar lining conforming to AWWA C104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA.
   e. Polyethylene: PE smooth wall pipe per Advanced Drainage Systems (ADS) N-12 (bell and spigot), or City approved equal, constructed per WSDOT Standard Specifications.

7. Special structures, oil/water separators and outlet controls shall be installed per plans and manufacturers recommendations.

8. All disturbed areas shall receive permanent erosion control in the form of vegetation establishment such as grass seeding or hydroseeding. A means shall be established to protect the permanent storm drain system prior to establishment of the permanent erosion control measures. This method shall be included in the soil erosion and water pollution/flood control plans.

9. Provide traffic control plan(s) as required in accordance with MUTCD.

10. Call underground locate line 1-800-424-5555 a minimum of 48 hours prior to any excavations.

11. Storm drain pipelines shall be installed to the far property line(s) to serve adjacent tributary areas as may be warranted. They shall be appropriately sized to accommodate flows as further identified herein. Pipes shall be designed to facilitate a minimum 2.5 feet/second flow unless otherwise approved by the City Engineer.

12. All storm water pipes shall be pressure tested between catch basins and TV inspected.

13. Natural surface water shall bypass all retention and detention storm systems.

Erosion Control General Notes:

1. Approval of this erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).

2. The implementation of these ESC plans and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established.

3. The boundaries of the clearing limits shown on this plan shall be clearly marked in the field prior to construction. During the construction period, no disturbance beyond the marked clearing limits shall be permitted. The marking shall be maintained by the applicant/contractor for the duration of the construction.

4. The ESC facilities shown on this plan must be constructed 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 & utility standards.

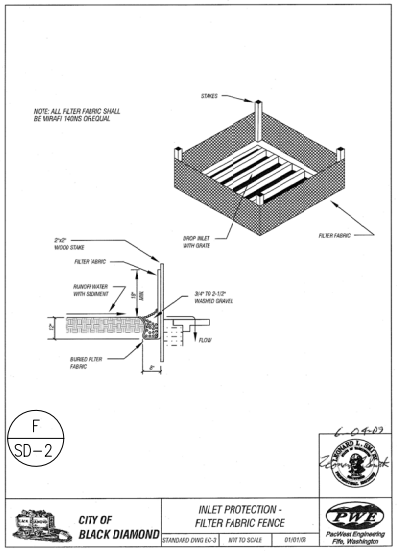
5. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and to ensure that sediment and sediment-laden water do not leave the site.

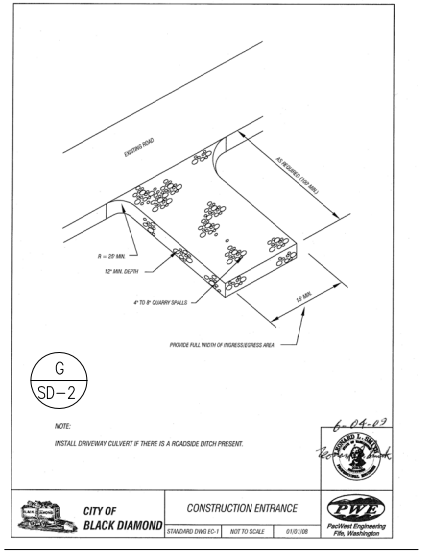
6. The ESC facilities shall be inspected daily by the applicant/contractor and maintained as necessary to ensure their continued functioning.

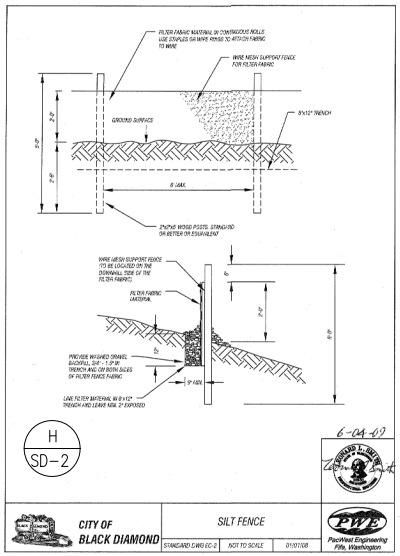
7. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within the 48 hours following a major storm event.

8. At no time shall more than 1' of sediment be allowed to accumulate within a the sump of a trapped catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.

9. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.







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BY: _____ DATE: _____
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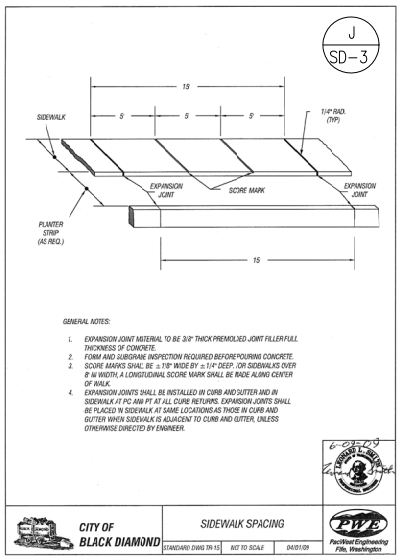
Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

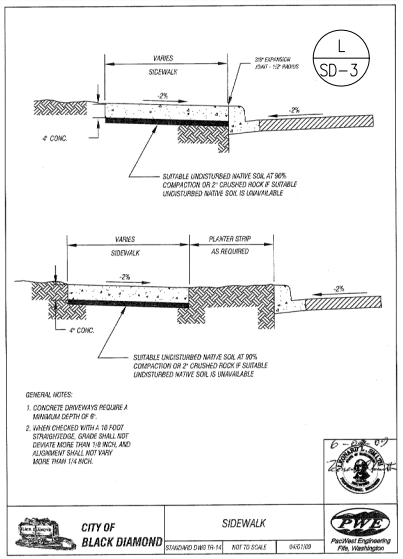
Sec. 14, TWN. 21N, Range 6E, W.M.
Rainier View
Manufactured Home Park
Street Drainage & Erosion Control
General Notes & Details

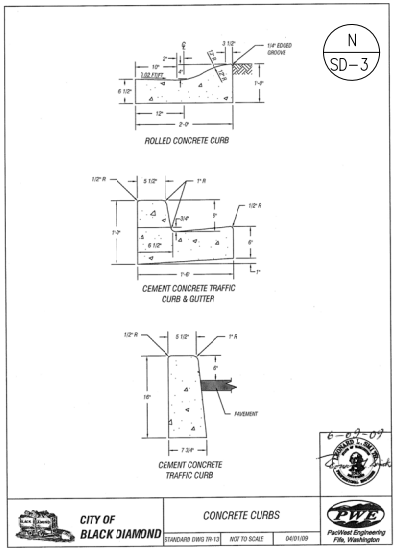
3-18-24

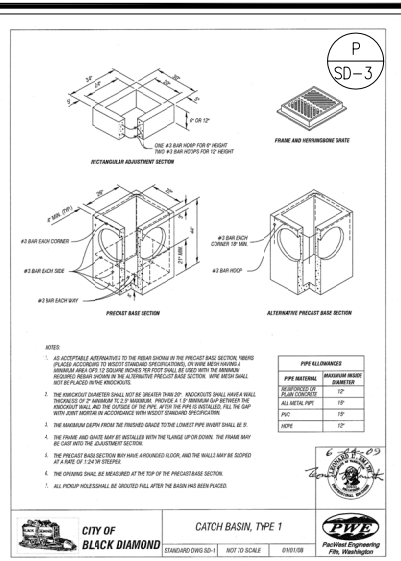
SHEET ID CODE
SD 2 of 4

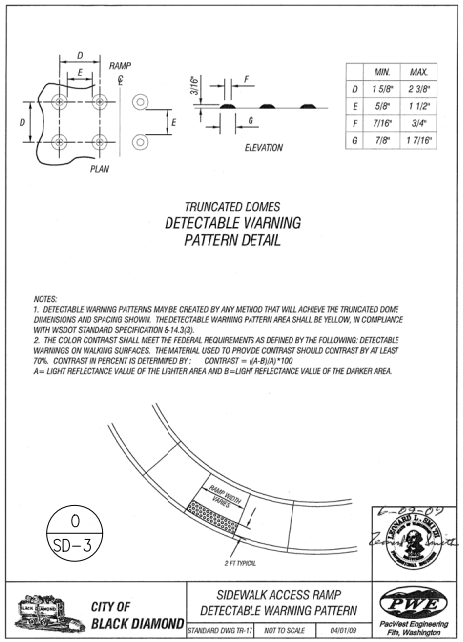
SHEET No.
14 of 21

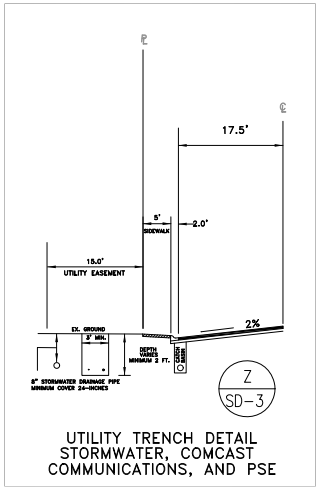












APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____

Signed, City Engineer

Approval Expires: _____

DESIGN INFORMATION

PROJECT IDENTIFICATION No.

FILE NAME: BW-COVER SITE PLAN

ACTION		
DESIGNED		3-18-24
DRAWN		3-18-24
CHECKED		3-18-24
PLOTTED	DATES	

REVISION BLOCK: 4th Revision

Turner Engineering
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View

Manufactured Home Park

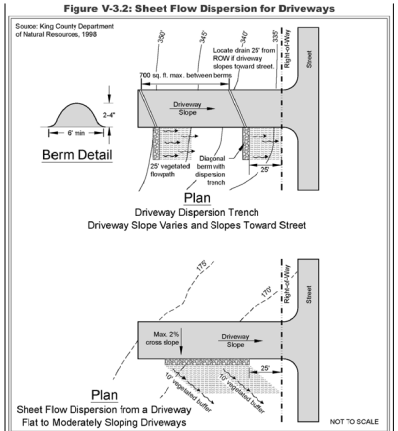
Street & Stormwater Details

3-18-24

SHEET ID CODE SD 3 of 4

SHEET No. 15 of 21

Figure V-3.2: Sheet Flow Dispersion for Driveways



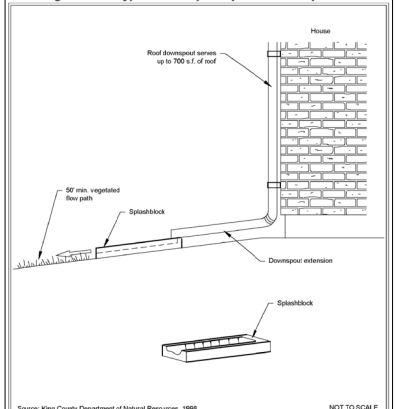
DEPARTMENT OF ECOLOGY State of Washington

Sheet Flow Dispersion for Driveways

Revised December 2016

AE
SD-4

Figure V-4.6: Typical Downspout Splashblock Dispersion

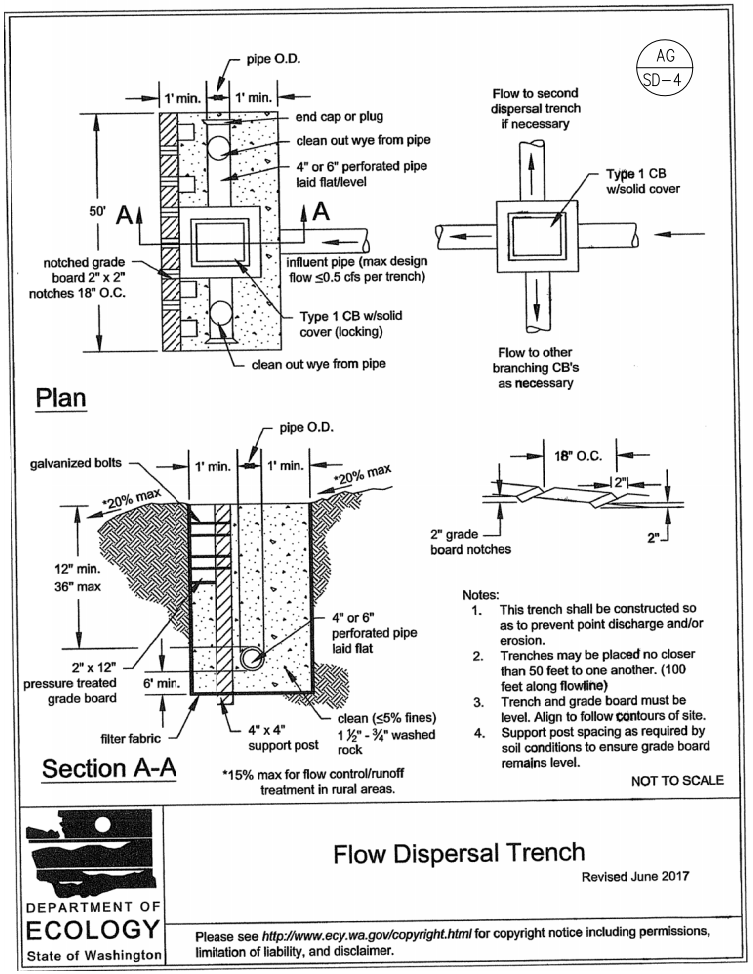


DEPARTMENT OF ECOLOGY State of Washington

Typical Downspout Splashblock Dispersion

Revised December 2016

AF
SD-4



AG
SD-4

DEPARTMENT OF ECOLOGY State of Washington

Flow Dispersal Trench

Revised June 2017

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

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DRAWN			3-18-24
CHECKED			3-18-24
PLOTTED DATES			

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Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

Rainier View

Manufactured Home Park

Street & Stormwater Details

3-18-24

SHEET ID CODE
SD 4 of 4

SHEET No.
16 of 21

Sanitary Sewer General Notes:

1. All work shall conform to City of Black Diamond Sanitary Sewer Standards and the Developer Extension Agreement.

2. All new manholes shall have a minimum inside diameter of 48" and shall conform to the Standard Details.

3. Sanitary sewer pipe shall be PVC conforming to ASTM-D3034 SDR 35 or Ductile Iron pipe (class 52), provided the ductile iron pipe is lined with epoxy, polyurethane, or SewperCoat, where required by the City Engineer. Bedding and backfill shall be as shown in the Standard Details.

4. Where shown as C900-PVC, the sewer pipe shall be pressure class 150 (DR 18) conforming to AWWA C900.

5. All lateral sewers shall be 6" diameter pipe at a minimum 2% slope.

6. Lateral sewer stations are referenced from nearest downstream manhole.

7. At a minimum, temporary lot corners must be set and side sewer locations verified in the field prior to construction.

8. All lateral sewer stubs shall be capped with a watertight plug. Plug location shall be marked with a 2" x 4" pressure treated wood stake, minimum 12' long, with one end buried at depth of the plug invert and extending at least 3' vertically out of the ground. The portion of stake above ground shall be painted white and marked with the word "SEWER" and the depth from pipe invert to ground surface. Connect pipe to stake with a 14-gauge wire at or above finished ground level.

9. The locations of all existing utilities shown hereon have been established by field survey or obtained from available records and should therefore be considered approximate only and not necessarily complete. It is the sole responsibility of the contractor to independently verify the accuracy of all utility locations shown, and to further discover and avoid any other utilities not shown hereon which may be affected by the implementation of this plan.

10. All testing and connections to existing mains shall be done in the presence of a representative of the City of Black Diamond. Side sewer pipelines shall be inspected by the City and the test witnessed by the City prior to backfilling the trench. If any work is backfilled or covered without approval or consent of the City, it must be uncovered for inspection.

11. All trenches shall be compacted and pavement installed prior to final testing and TV & video inspection of sewer lines for acceptance.

12. Lateral sewers shall be tested for acceptance at the same time the main sewer is tested.

13. Tops of manholes within public rights-of-way shall not be adjusted to final grade until just after paving.

14. All manholes in unpaved areas shall include a concrete seal around adjusting rings and shall be equipped with locking covers per the Standard Details. In paved areas the material around the manhole shall match the surrounding paving material

15. Manhole elevation shall be above the 100 year flood plain.

16. Contractor shall adjust all manhole rims to flush with final finished grades, unless otherwise shown.

17. All sewer main extensions must be "staked" by survey for "line and grade" and cut sheets provided to the Engineer, prior to starting construction.

18. All sewer mains in plats or developments must be located within public right-of-way or tracts.

19. Contractor shall install, at all connections to existing down stream manholes, plugs to prevent foreign materials from entering existing sanitary sewer system. Plugs shall remain in place throughout the duration of construction and shall be removed along with collected debris at the time of final inspection and in the presence of a representative of the Ci??????8??ty of Black Diamond.

20. Surface restoration of existing asphalt pavement shall be as required by these Standards or the Developers Extension Agreement.

21. Contractor shall maintain a minimum of 10' horizontal separation between all water and sewer lines. Any conflicts shall be reported to the City and the Engineer prior to construction.

22. It shall be the contractor's responsibility to ensure that no conflicts exist between sanitary sewer lines and proposed or existing utilities prior to construction.

23. Minimum cover over sewer mainline pipe shall be 4', unless otherwise approved by the City Engineer.

24. The Contractor shall use a vacuum street sweeper to remove dust and debris from pavement areas as directed by the Engineer. Care shall be taken to control fugitive dust. Flushing of streets shall not be permitted.

25. Before commencement of trenching, the Contractor shall provide erosion control measures in accordance with these standards and the Department of Ecology requirements.

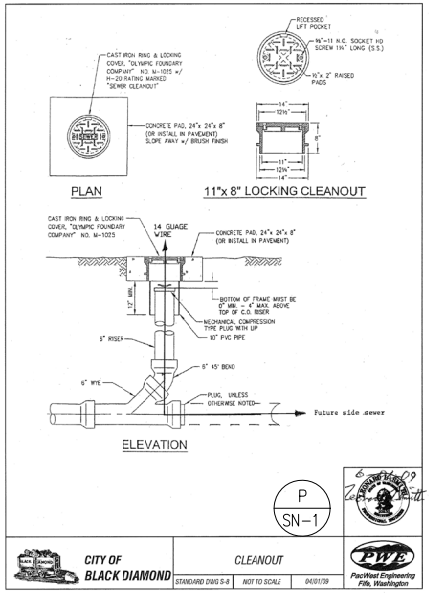
26. Side sewer demolition shall be performed prior to removal of building foundation. The side sewer for each building shall be excavated and removed from the house connection to the edge of the public right-of-way, or main as directed by the City. The Contractor shall cap the end of the lateral sewer to remain in place as applicable. Side sewer demolition shall be performed in t he presence of an authorized representative of the City of Black Diamond.

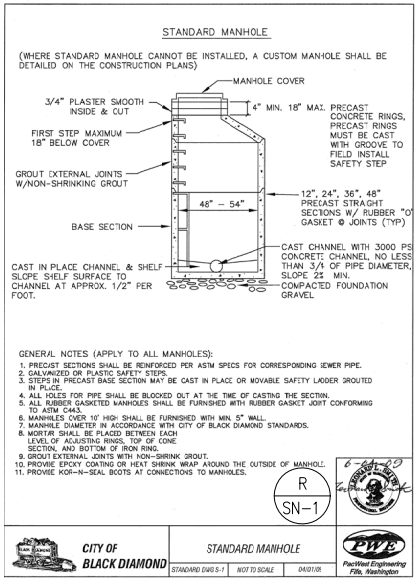
27. Avoid crossing water or sewer mains at highly acute angles. The measured acute angle between utilities should be 45 to 90 degrees.

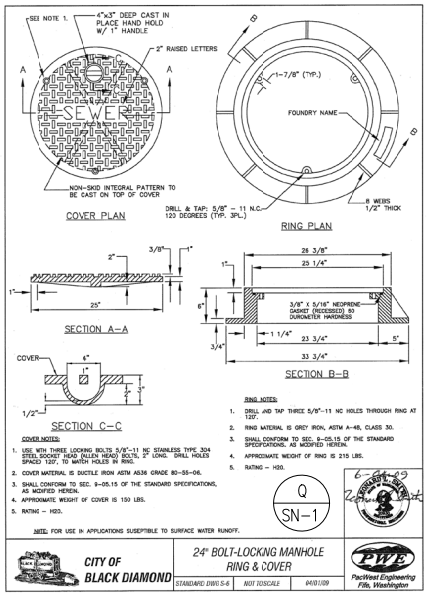
28. At points where existing thrust blocking is found, minimum clearance between the concrete blocking and other buried utilities or structures shall be 5'.

29. Where new utility line crosses below an existing AC main, the AC pipe shall be replaced with DI pipe to 3' past each side of the trench as shown on the City Standard Details. Alternatively, where directed by the Engineer, the trench shall be backfilled with controlled density fill (CDF, aka flowable fill) from bottom of trench to bottom of the AC main.

30. Call 1-800-424-5555 48 hours before construction for utility locations.







APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
Signed, City Engineer

Approval Expires: _____

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ACTION		
DESIGNED		3-18-24
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CHECKED		3-18-24
PLOTTED DATES		

REVISION BLOCK: 4th Revision

Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

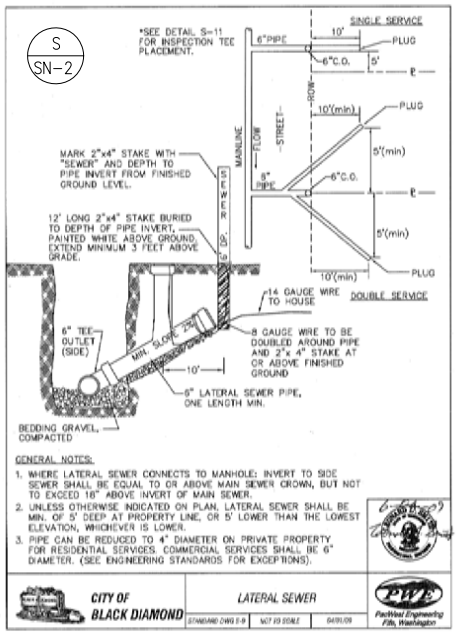
Sec. 14, TWN. 21N, Range 6E, W.M.

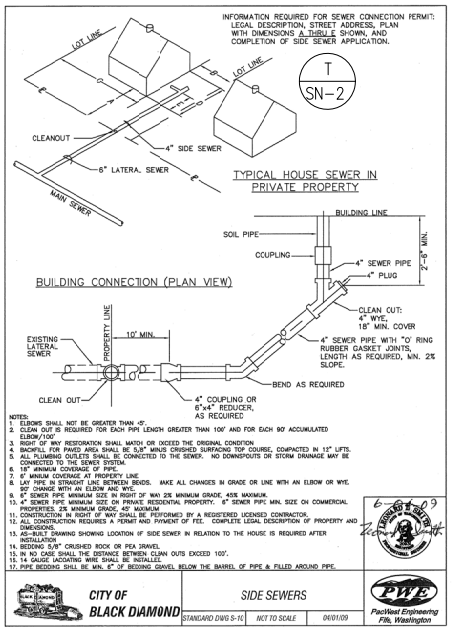
Rainier View
Manufactured Home Park
Sewer Notes & Details

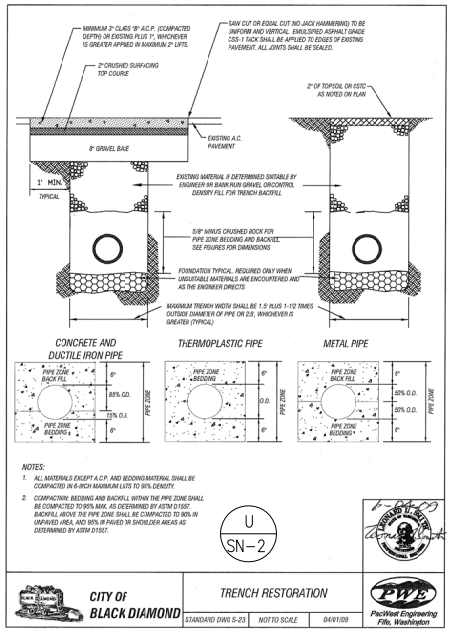
3-18-24

SHEET ID CODE
SN 1 of 2

SHEET No.
17 of 21







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4405 7th Ave SE Suite 301
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Rainier View

Manufactured Home Park

Sewer Notes & Details

3-18-24

SHEET ID CODE
SN 2 of 2

SHEET No.
18 of 21

Water General Notes:

1 All work shall conform to City of Black Diamond City Engineering Design and Construction Standards and the Developer Extension Agreement.

2 All pipes shall be cement lined, ductile iron class 52 unless otherwise shown. Minimum size water line is 8".

3 All pipe and fittings not to be disinfected in place shall be swabbed with 1% available chlorine solution prior to installation.

4 The new watermain shall be connected to the existing system only after new main is pressure tested, flushed, disinfected, and satisfactory bacteriological sample results are obtained.

5 After disinfecting the watermain, chlorinated water shall be disposed of in a manner that does no physical or environmental damage to property, streams, storm sewers or any waterways.

6 Watermain shut-off shall be coordinated with the City's Utilities Superintendent for preferred timing during flow control conditions. Watermain shut-offs shall not be scheduled to take place on Fridays, or on the day before a City holiday, unless otherwise approved by the City.

7 The locations of all existing utilities shown hereon have been established by field survey or obtained from available records and should therefore be considered approximate only and not necessarily complete. It is the sole responsibility of the contractor to independently verify the accuracy of all utility locations shown, and to further discover and avoid any other utilities not shown hereon which may be affected by the implementation of this plan.

8 Deflect the watermain above or below existing utilities as required to maintain 3' minimum cover and 12" minimum vertical clearance between utilities unless otherwise specified.

9 The watermain shall be installed only after the roadway subgrade is backfilled, graded and compacted in cut and fill areas.

10 Trench backfill of 5/8" minus gravel and surface restoration of existing asphalt pavement shall be as required by these standards (see Trench Restoration detail).

11 All fittings shall be blocked per Standard Detail unless otherwise specified.

12. All water meters shall be 5/8" x 3/4" unless otherwise specified.

13 When working with asbestos cement pipe, the Contractor is required to maintain workers' exposure to asbestos material as prescribed in WAC 296-62-07705. All asbestos cement pipe from cut ins or tie-ins shall be removed and disposed of in accordance with WAC's.

14 Call 1-800-424-5555 a minimum of 48 hours before construction for utility locations.

15 Uniform plumbing code requires the installation of privately owned and operated pressure reducing valves where the operating pressure exceeds 80 psi.

16 The Contractor shall use a vacuum street sweeper to remove dust and debris from pavement areas. Care shall be taken to control fugitive dust in conformance with State standards. Flushing of streets shall not be permitted.

17 Before commencement of trenching, the Contractor shall provide erosion control measures in accordance with these standards and the Department of Ecology requirements.

18. Abandonment of existing water services shall be accomplished as follows:

a. If no corporation is available, remove existing service saddle from water main and replace with new stainless steel repair band, Romac SS2, Romac Service Saddle 101S, or approved equal (will not be required when water main is to be abandoned prior to service demolition).

b. Remove and return existing meter, setter and meter box to the City of Black Diamond Water Department.

c Cap or crimp (if copper) existing service line to be abandoned in place, each end.

r ?????(??????????(?????19 Where new utility line crosses below an existing AC main, the trench shall be back?????(?????filled with controlled density fill (CDF, ala flowable fill) from bottom of trench to bottom of the AC main. If the AC main appears to be damaged or at risk of failure, the City will require section replacement according to the Standard Details for "Typical AC Watermain Crossing Replacement Detail".

20 Avoid crossing water or sewer mains at highly acute angles. The smallest angle measure between utilities should be 45 to 90-degrees.

21 Where watermain crosses above or below sanitary sewer, one full length of water pipe shall be centered for maximum joint separation. Encasement may be required at the discretion of the City Engineer.

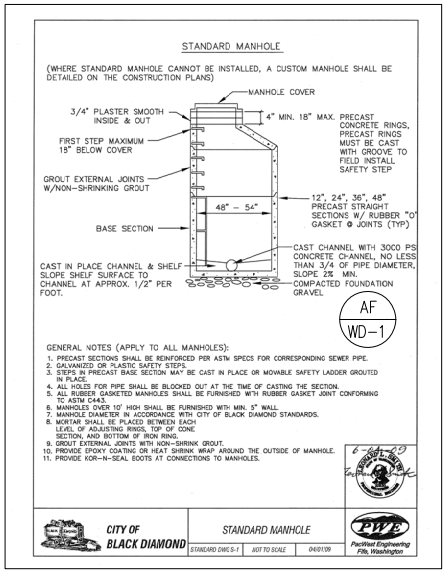
22 At points where existing thrust blocking is found, minimum clearance between the concrete blocking and other buried utilities or structures shall be 5'.

23 All new buildings and residences shall include in their water service a suitable shut off check valve and pressure reducing valve. Shut off shall be accessibly located on the customer side of the meter setter. See customer service detail.

24 Contractor shall allow for postal delivery access to all residences during project construction. Contractor shall provide and maintain mail boxes and paper boxes during construction.

25. Contractor shall allow and provide for emergency vehicle access to all properties during construction.

26. Between the time that a fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.



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Signed, City Engineer

Approval Expires: _____

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PLOTTED DATES		

REVISION BLOCK: 4th Revision

Turner Engineering Consulting
4405 7th Ave SE Suite 301
Lacey, WA 98503
360-491-6900

Sec. 14, TWN. 21N, Range 6E, W.M.

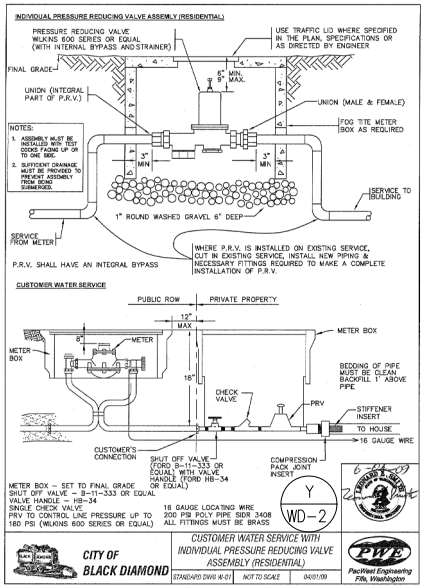
Rainier View
Manufactured Home Park

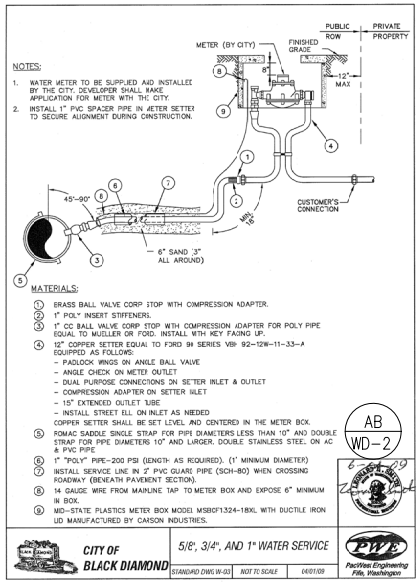
Water Notes & Details

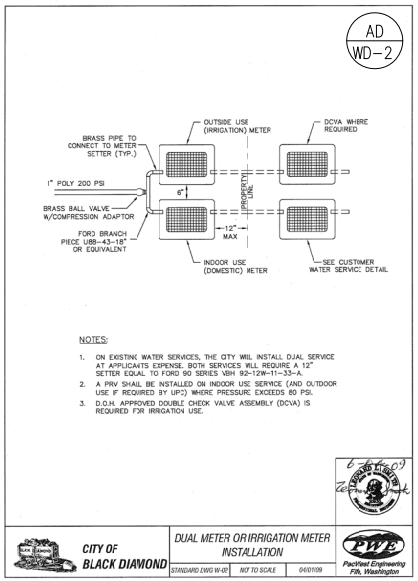
3-18-24

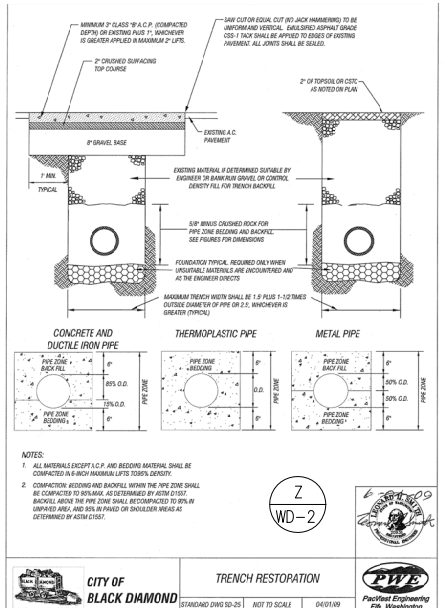
SHEET ID CODE
WD 1 of 2

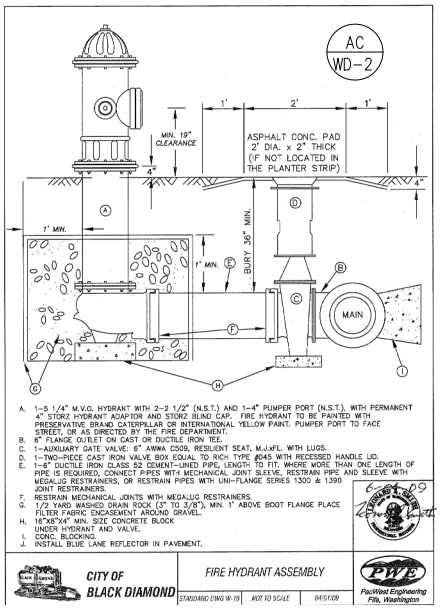
SHEET No.
19 of 21











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Water Notes & Details

3-18-24

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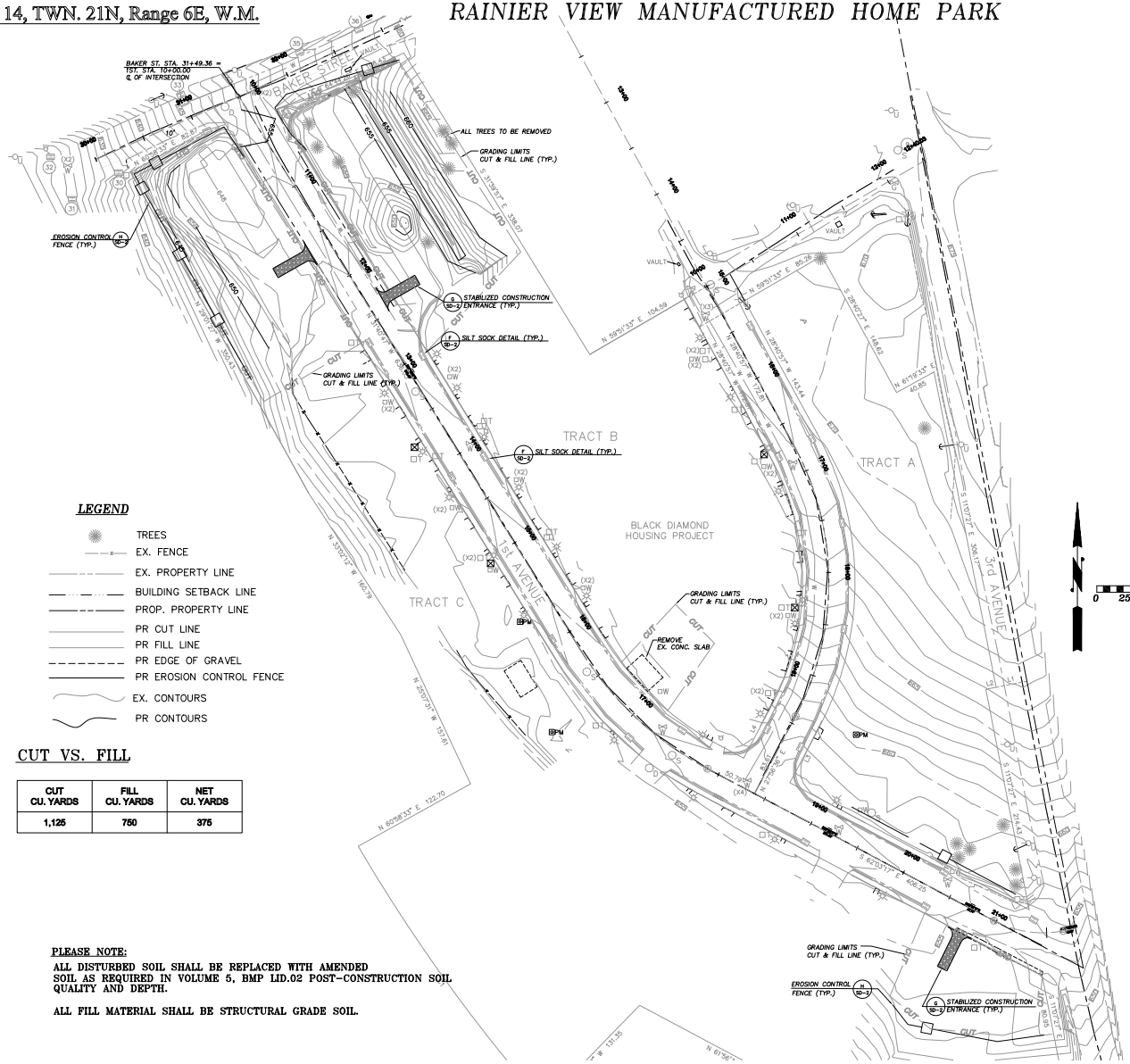
SHEET No.
20 of 21

SEC. 14, TWN. 21N, Range 6E, W.M.

RAINIER VIEW MANUFACTURED HOME PARK



LEGEND

- TREES
- EX. FENCE
- EX. PROPERTY LINE
- BUILDING SETBACK LINE
- PROP. PROPERTY LINE
- PR CUT LINE
- PR FILL LINE
- PR EDGE OF GRAVEL
- PR EROSION CONTROL FENCE
- EX. CONTOURS
- PR CONTOURS

CUT VS. FILL

CUT CU. YARDS	FILL CU. YARDS	NET CU. YARDS
1,125	750	375

PLEASE NOTE:

ALL DISTURBED SOIL SHALL BE REPLACED WITH AMENDED SOIL AS REQUIRED IN VOLUME 5, BMP LID.02 POST-CONSTRUCTION SOIL QUALITY AND DEPTH.

ALL FILL MATERIAL SHALL BE STRUCTURAL GRADE SOIL.

VERTICAL DATUM
NAVD 1988
WASHINGTON STATE PLANE
COORDINATES NORTH ZONE

BENCHMARK

INTERSECTION OF 1ST AND BAKER ST. MONUMENT IN CASE
NORTHING: 114872.14
EASTING: 1349492.01
ELEV.: 650.43

NOT A BOUNDARY SURVEY
All references to property lines, bearing, corners, or any references which indicate property alignment or locations were acquired from

Chehalis Valley Surveying

FOR CONSTRUCTION USE ONLY

NOTE: THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION & PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

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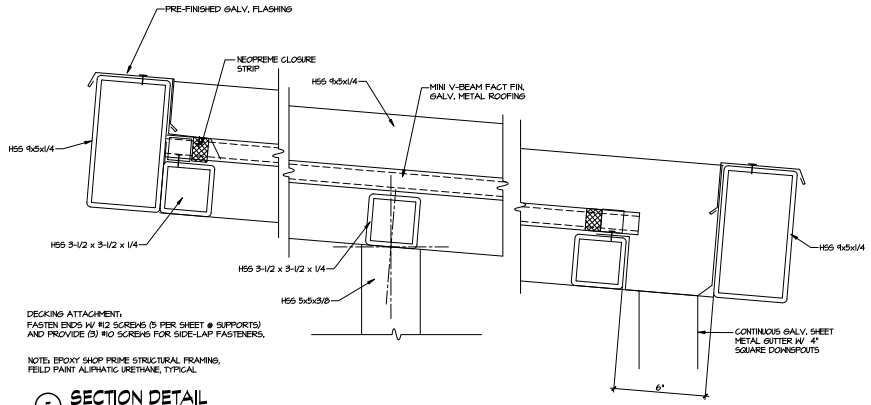
Rainier View
Manufactured Home Park
Erosion Control & Grading Site Plan

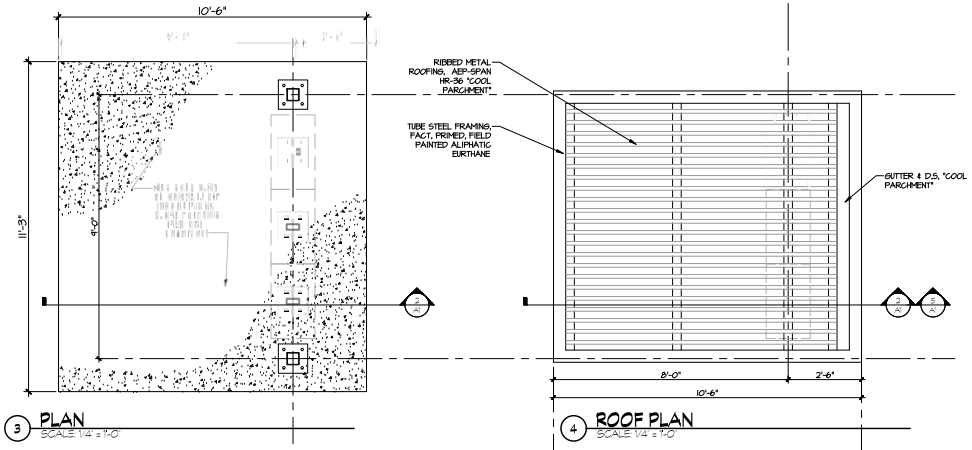
3-18-24

GR 1 OF 1

21 of 21

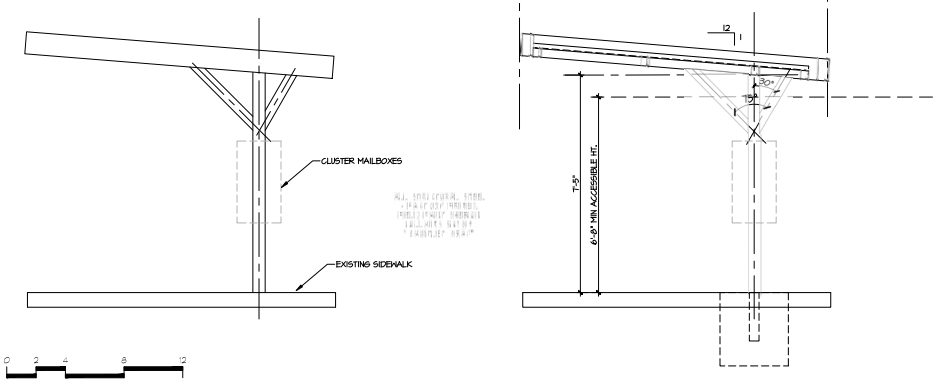


5 SECTION DETAIL
SCALE: 3" = 1'-0"



3 PLAN
SCALE: 1/4" = 1'-0"

4 ROOF PLAN
SCALE: 1/4" = 1'-0"



1 SIDE ELEVATION
SCALE: 1/4" = 1'-0"

2 SECTION
SCALE: 1/4" = 1'-0"

PROJECT NOTES

DESCRIPTION: SHELTER FOR MAILBOX UNITS, 118 S.F. CONCRETE SLAB WITH STRUCTURAL STEEL AND METAL ROOF.

OCCUPANCY: U - UTILITY AND MISCELLANEOUS

PROJECT CONTACTS

APPLICANT	THE KIRKBRIDE GROUP CONTACT: FRANK KIRKBRIDE 4405 - 7th AVE. SE, SUITE 301 LACEY, WA 98503 (360) 491-6400 FAX: (360) 491-6404
ARCHITECT	LANCE MUELLER & ASSOCIATES KATHY NAGLE 130 LAKESIDE, SUITE 250 SEATTLE, WA 98122 (206) 325-2553 kathy@lmueller.com
STRUCTURAL ENGINEER	SHUTLER ENGINEERING JOHN HEADLAND 12509 BEL-RED ROAD, #100 BELLEVUE, WA 98005 (425) 450--4075 FAX: (425) 452-4076 john@shutler.com

DRAWING INDEX

23-041	JOB NO.
KS	DRAWN
-	CHECKED
4/26/23	DATE
	PERMIT SUBMITTAL
4/26/23	DATE

REGISTERED ARCHITECT LANCE P. MUELLER STATE OF WASHINGTON 2396

THE KIRKBRIDE GRUOUP

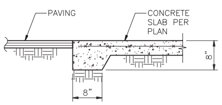
MAIL BOX SHELTER

BLACK DIAMOND, WA

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

PLAN & SECTIONS

sheet A1



SECTION A–1.0

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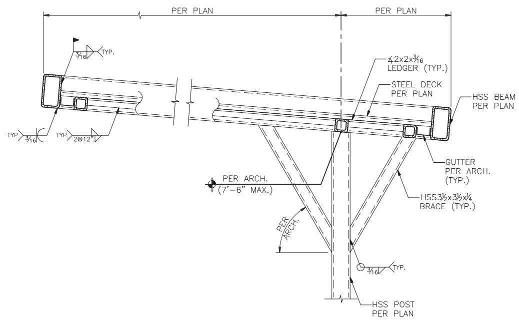

SECTION C–1.0

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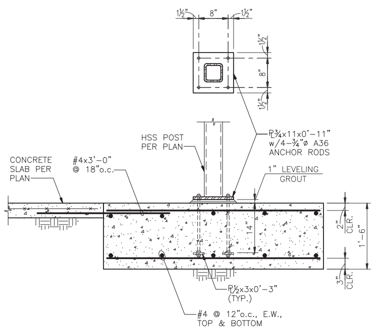

SECTION B–1.0

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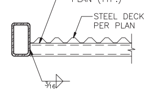
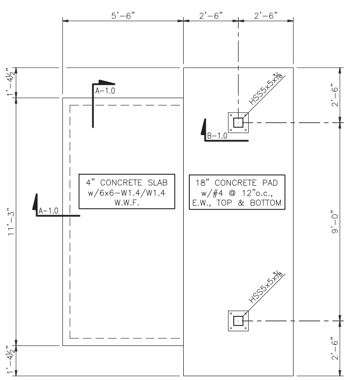


SECTION D–1.0

SCALE: ¾"=1'-0"

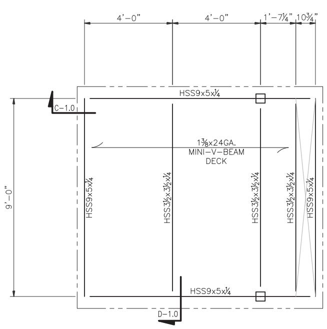


FOUNDATION PLAN

SCALE: ⅜"=1'-0"

NOTES: 1) VERIFY EXISTING CONDITIONS AND DIMENSIONS IN THE FIELD. NOTIFY ARCHITECT AND ENGINEER OF DIFFERENCES.

2) COORDINATE DIMENSIONS WITH ARCHITECTURAL DRAWINGS.



ROOF FRAMING PLAN

SCALE: ⅜"=1'-0"

NOTES: 1) VERIFY EXISTING CONDITIONS AND DIMENSIONS IN THE FIELD. NOTIFY ARCHITECT AND ENGINEER OF DIFFERENCES.

2) COORDINATE DIMENSIONS WITH ARCHITECTURAL DRAWINGS.

3) ATTACH DECK TO SUPPORTS w/#12 SCREWS EACH FLUTE w/#12 SIDE LAP SCREWS @ 12"o.c.

(**STEEL ROOF DECKING:** CONTINUED)

THE DECK AND ACCESSORIES SHALL BE FORMED FROM SHEETS CONFORMING TO ASTM A1008, GRADE 50. THE DECK SHALL BE PLACED ON THE SUPPORTING FRAMEWORK WITH MINIMUM END LAP OF 2" CENTERED OVER THE SUPPORTS. THE DECK SHALL BE ATTACHED TO ALL SUPPORTS AS INDICATED IN THE ROOF DIAPHRAGM ATTACHMENT SCHEDULE. THE DECK SHALL PROVIDE THE MINIMUM DIAPHRAGM SHEAR CAPACITIES IN ACCORDANCE WITH IAMPO-ES REPORT ER-0550 OR APPROVED ALTERNATE.

SPECIAL INSPECTIONS:

SPECIAL INSPECTIONS PER IBC SECTION 1705. A COPY OF ALL INSPECTION REPORTS AND TEST RESULTS FOR ALL REQUIRED INSPECTIONS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT, SHUTLER CONSULTING ENGINEERS, THE OWNER AND THE ARCHITECT BY THE TESTING AGENCY FOR REVIEW. THE TESTING AGENCY SHALL BE AN INDEPENDENT TESTING AGENCY APPROVED BY THE BUILDING DEPARTMENT. THE FOLLOWING INSPECTIONS SHALL BE PROVIDED AS A MINIMUM; ADDITIONAL INSPECTIONS AS REQUIRED BY THE BUILDING DEPARTMENT SHALL ALSO BE PERFORMED. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION.

SEE SPECIAL INSPECTION FREQUENCY TABLE ON THIS SHEET FOR BOTH ON SITE CONSTRUCTION AND OFF SITE FABRICATION .

SHOP DRAWINGS:

SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS CONSISTING OF REPRODUCTIONS OR COPIES OF ANY PORTIONS OF THE STRUCTURAL DRAWINGS WILL NOT BE ACCEPTED AS SHOP DRAWINGS NOR REVIEWED BY THE STRUCTURAL ENGINEER AS SUCH.

1) REINFORCING STEEL
   a)structural concrete elements i.e. beams, walls, col, ftgs, etc.
2) STRUCTURAL STEEL ITEMS

THE ENGINEER OF RECORD WILL REVIEW SHOP DRAWINGS FOR DESIGN INTENT ONLY. VERIFICATION OF DIMENSIONS AND QUANTITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR AND ARE NOT GUARANTEED BY THE ENGINEER OF RECORD. DRAWINGS FOR COMPONENTS DESIGNED PRIMARILY BY THE MANUFACTURER SHALL BEAR THE STAMP OF A LICENSED WASHINGTON STATE STRUCTURAL ENGINEER AND BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR A CURSORY REVIEW FOR COMPLIANCE WITH THE INTENT OF THE STRUCTURAL DRAWINGS AND FOR LOADS IMPOSED ON THE BASIC STRUCTURE. THE COMPONENT DESIGNER IS RESPONSIBLE FOR CODE CONFORMANCE AND ALL NECESSARY CONNECTIONS NOT SPECIFICALLY CALLED OUT ON ARCHITECTURAL OR STRUCTURAL DRAWINGS. SUBMISSIONS SHALL INCLUDE A REPRODUCIBLE AND TWO COPIES; REPRODUCIBLE WILL BE REVIEWED AND RETURNED. SHOP DRAWINGS MUST BE REVIEWED AND STAMPED BY THE CONTRACTOR PRIOR TO REVIEW BY THE ENGINEER.

SHOP DRAWINGS ARE AN AID FOR FIELD PLACEMENT AND ARE SUPERSEDED BY THE STRUCTURAL DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO MAKE CERTAIN THAT ALL CONSTRUCTION IS IN FULL AGREEMENT WITH THE LATEST STRUCTURAL DRAWINGS.

SPECIAL CONDITIONS:

THE DRAWINGS INDICATE THE STRUCTURE IN ITS FINAL CONDITION. DURING CONSTRUCTION THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING, BRACING, AND GUYING IN ACCORDANCE WITH SOUND PRACTICE AND ALL NATIONAL, STATE, AND LOCAL CODES. CONTRACTOR TO COORDINATE ALL TRADES AND VERIFY DIMENSIONS IN FIELD. OBTAIN ARCHITECT'S APPROVAL PRIOR TO ALL FIELD CHANGES. SEE ARCHITECTURAL DRAWINGS FOR ALL FLOOR AND WALL OPENING DIMENSIONS AND LOCATIONS, FLOOR AND WALL FINISHES, ETC.

SPECIAL INSPECTION PROGRAM

VERIFICATION AND INSPECTION	INSPECTION FREQUENCY		REFERENCED STANDARD
	CONTINUOUS	PERIODIC	

STRUCTURAL STEEL

Special inspections and non-destructive testing of structural steel elements in buildings, structures and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 360.

REQUIRED SPECIAL INSPECTIONS AND TEST OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS INSPECTIONS	PERIODIC INSPECTIONS	REFERENCED STANDARD	IBC REFERENCE
1. Inspection of reinforcing steel, including prestressing tendons, and placement	—	X	ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. Reinforcing bar welding:				
a. Verify weldability of reinforcing bars other than ASTM A706		X	AWS D1.4	—
b. Inspect single-pass fillet welds, maximum 5/16"; and		X	ACI 318:26.6.4	
c. Inspect all other welds.	X			
3. Inspection of anchors cast in concrete.	—	X	ACI 318: 17.8.2	—
4. Inspect anchors post-installed in hardened concrete members.				
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads	X		ACI 318: 17.8.2.4	—
b. Mechanical anchors and adhesive anchors not defined in 4.a.		X	ACI 318: 17.8.2	
5. Verifying use of required design mix	—	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. Prior to concrete placement, fabricate specimens for strength test perform slump and air content test, and determine the temperature of the concrete.	X	—	ASTM C172, ASTM C31, ACI 318: 26.5, 26.12	1908.10
7. Inspection of concrete and shotcrete placement for proper application techniques.	X	—	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8. Verify maintenance of specified curing temperature and techniques.	—	X	ACI 318: 26.5.3-26.5.5	1908.9
9. Inspect prestressed concrete for:				
a. Application of prestressing forces; and	X	—	ACI 318: 26.10	—
b. Grouting of bonded prestressing tendons.	X	—		
10. Inspect erection of precast concrete members.	—	X	ACI 318: 26.9	—
11. Verification in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	—	X	ACI 318: 26.11.2	—
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	—	X	ACI 318: 26.11.1.2(b)	—

REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS INSPECTIONS	PERIODIC INSPECTIONS
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	—	X
2. Verify excavations are extended to proper depth and have reached proper material.	—	X
3. Perform classification and testing of compacted fill materials.	—	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	—
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	—	X

Special Inspection/Testing Program Notes:

1. The special inspector shall be a qualified person who shall demonstrate competence to the satisfaction of the Building Official for the type of inspections listed.
2. If necessary, the contractor shall arrange a pre-construction meeting with the Architect, Engineer, Building Official, Testing Agency to review the special inspection program.
3. Duties of the Special Inspector include, but are not limited to:
   a. Observe the work for conformance with the approved permit plans and specifications. Discrepancies shall be brought to the attention of the Contractor for correction, if uncorrected, then to the attention of the Architect, Engineer, and Building Official.
   b. Issue Inspection Reports for each inspection to the Contractor, Architect, Engineer, and Building Official as a minimum. The reports shall be issued in a timely manner.
   c. The Special Inspector shall submit a final report stating whether the work requiring special inspection was inspected, whether the work was completed in conformance with the approved plans and specifications, and whether the work was in conformance with any applicable workmanship provisions of the applicable code or standard.
4. Special inspections and testing requirements apply equally to all bidder designed components.
5. Fabricators shall submit a certificate of compliance to the Building Official stating that work was completed in accordance with the approved construction documents.

GENERAL NOTES

CODE: INTERNATIONAL BUILDING CODE, 2018 EDITION

BUILDING RISK CATEGORY = II

LIVE LOADS:

UNIFORM LOADS:

LOCATION	LIVE LOAD	REDUCIBLE
ROOF	25 PSF (SNOW)	NO

WIND DESIGN INFORMATION:

WIND LOADS ON THE MAIN WIND-FORCE RESISTING SYSTEM (MWFRS) WAS DETERMINED USING THE ENVELOPE PROCEDURE.

WIND SPEED V_{ult} = 110 MPH V_{asd} = 85 MPH
EXPOSURE "B" λ= 1.00 K_{zt}=1.00

SEISMIC DESIGN INFORMATION:

SEISMIC FORCE RESISTING SYSTEM IS A STEEL ORDINARY CANTILEVER COLUMN SYSTEM. THE STRUCTURE WAS ANALYZED USING THE EQUIVALENT LATERAL FORCE PROCEDURE.

R = 1.25 Ω_O = 1.25
S_S = 116.6% S_{DS} = 0.933
S_1 = 40.0% S_{D1} = 0.507
C_S = 0.80
I_E = 1.0
SITE SOIL CLASS = D-default
SEISMIC DESIGN CATEGORY = D
BASE SHEAR, V = 660 LBS

FOUNDATIONS:

SOIL BEARING CAPACITY ASSUMED TO BE 1500 PSF. SOILS ENGINEER TO VERIFY IN FIELD. ALL FOOTINGS SHALL BEAR ON UNDISTURBED EARTH OR SOIL COMPACTED TO 95% MODIFIED PROCTOR PER ASTM D-1557. ALL EXTERIOR FOOTINGS SHALL BE 18 INCHES MINIMUM BELOW LOWEST ADJACENT GRADE.

SLABS ON GRADE:

THE SLAB ON GRADE FOR THIS PROJECT IS TYPICAL OF OTHER BUILDINGS WITH SIMILAR FLOOR LOADING AND SOIL CONDITIONS CONSTRUCTED IN THIS AREA. THE SLAB HAS NOT BEEN DESIGNED FOR ANY SPECIFIC LIVE LOAD AND HAS BEEN DETAILED TO MEET LOCAL INDUSTRY STANDARDS FOR SIMILAR BUILDINGS. NO CONSTRUCTION LOADS HAVE BEEN INCLUDED IN THE DESIGN OF THE SLAB.

CONCRETE:

ALL CONCRETE SHALL BE STONE-AGGREGATE CONCRETE HAVING A UNIT WEIGHT OF APPROXIMATELY 145 POUNDS PER CUBIC FOOT. 28 DAY COMPRESSIVE STRENGTH SHALL BE AS FOLLOWS:

CONSTRUCTION	F'c	EXPOSURE CLASS	MAX W/C RATIO	AIR CONTENT
ALL CONCRETE	3,500 PSI	F1, S0, W0, C1	0.55	5%

CONCRETE IN ALL EXTERIOR SLABS TO BE AIR ENTRAINED 6% PLUS OR MINUS 1%.

CONCRETE SUBMITTALS SHALL CONFORM TO ACI 318 CHAPTER 26. MIXING AND PLACING OF ALL CONCRETE SHALL BE IN ACCORDANCE WITH THE IBC AND ACI CODE 318. PROPORTION OF AGGREGATE TO CEMENT SHALL BE AS SUCH TO PRODUCE A DENSE, WORKABLE MIX, WITH A MAXIMUM SLUMP OF 5 INCHES, WHICH CAN BE PLACED WITHOUT SEGREGATION OR EXCESS FREE SURFACE WATER. 3/4" CHAMFER ON ALL EXPOSED CONCRETE EDGES UNLESS INDICATED OTHERWISE ON ARCHITECTURAL DRAWINGS. GROUT FOR COLUMN BASES SHALL BE "HI-FLOW GROUT" AS MANUFACTURED BY THE EUCLID CHEMICAL CO. OR APPROVED EQUAL.

ANCHORAGE TO CONCRETE:

EXPANSION BOLTS INTO CONCRETE SHALL BE SIMPSON STRONG-BOLT **2** AS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, INC. SPECIAL INSPECTION AND INSTALLATION PER ICC-ES REPORT ESR-3037.

EPOXY FOR FASTENING ANCHOR BOLTS AND REBAR INTO EXISTING CONCRETE TO BE SIMPSON SET-3G EPOXY ADHESIVE AS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, INC. SPECIAL INSPECTION AND INSTALLATION PER ICC-ES REPORT ESR-4057.

ANCHOR RODS INTO CONCRETE SHALL BE GRADE 36 MANUFACTURED AND INSTALLED PER ASTM F1554. ALL ANCHOR RODS/BOLTS ATTACHING PRESSURE TREATED WOOD PLATES TO CONCRETE SHALL BE HOT DIPPED GALVANIZED. ALL ANCHOR BOLTS FOR SILL PLATES SHALL BE PROVIDED WITH 3" X 3" X 0.229" THICK (MIN) PLATE WASHERS.

ANCHORAGE SUBSTITUTIONS MUST BE APPROVED BY THE ENGINEER. ANCHORAGE SUBSTITUTION REQUESTS REQUIRE ADDITIONAL ENGINEERING SERVICES.

REINFORCING STEEL:

ALL REINFORCEMENT SHALL CONFORM TO ASTM A615. (SEE BELOW FOR WELDED REBAR). ALL REINFORCING SHALL BE GRADE 60 (Fy = 60,000 psi; Fs = 32,000 psi). LAP CONTINUOUS REINFORCING BARS IN CONCRETE AS INDICATED BELOW. CORNER BARS (1'-7" BEND) WILL BE PROVIDED FOR ALL HORIZONTAL REINFORCEMENT. DETAIL STEEL IN ACCORDANCE WITH THE ACI MANUAL OF STANDARD PRACTICE OF DETAILING REINFORCED CONCRETE STRUCTURES. WELDED WIRE FABRIC TO CONFORM TO ASTM A82 AND A185.

MINIMUM LAP SPLICE LENGTHS FOR CONCRETE

BAR SIZE	f'c=3500
#4	26"
#5	33"
#6	40"
#7	58"

THE FOLLOWING MINIMUM COVER SHALL BE PROVIDED FOR REINFORCEMENT (UNLESS INDICATED OTHERWISE ON DRAWINGS):

A) CONCRETE CAST AGAINST & PERMANENTLY EXPOSED TO
   EARTH....................3" EARTH FACE
B) CONCRETE EXPOSED TO EARTH OR WEATHER (CAST IN FORMS)
   #6 THROUGH #18 BARS....................2"
   #5 BARS & SMALLER....................1-1/2"
C) CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND
   SLABS, WALLS & JOIST - #11 BAR & SMALLER................3/4"
   BEAMS & COLUMNS....................1-1/2"

STRUCTURAL STEEL:

RECTANGULAR AND SQUARE HSS SECTIONS SHALL CONFORM TO ASTM A500, GRADE C (Fy = 50,000 psi). STRUCTURAL STEEL FOR WIDE FLANGE BEAMS SECTIONS SHALL CONFORM TO ASTM A992, GRADE 50 (Fy = 50,000 psi). ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 (Fy = 36,000 psi) OR ASTM A992 GRADE 50 (Fy = 50,000 psi). APPLY PRIMER COATS PER ARCHITECTURAL SPECIFICATIONS.

WELDS NOT SPECIFIED SHALL BE 3/16" CONTINUOUS FILLET MINIMUM. ALL WELDS TO BE IN ACCORDANCE WITH AWS D1.1 AND D1.8, AND BY WABO CERTIFIED WELDERS. USE FRESH E70XX LOW HYDROGEN ELECTRODES. ALL STRUCTURAL WELDS SHOULD BE CONSIDERED PART OF THE SEISMIC FORCE RESISTING SYSTEM AND SHALL BE MADE WITH FILLER METAL PRODUCING WELDS WITH A MINIMUM CHARPY V-NOTCH TOUGHNESS OF 20 FT-LBS AT 0 DEGREES-F AS DETERMINED BY THE APPLICABLE AWS A5 CLASSIFICATION TEST METHOD. DEMAND CRITICAL WELDS, AS SHOWN ON THE STRUCTURAL DRAWINGS, SHALL MEET THE REQUIREMENTS OF D1.8. THE CONTRACTOR SHALL SUBMIT TO THE BUILDING OFFICIAL A WELDING PROCEEDURE SPECIFICATION THAT VERIFIES THESE REQUIREMENTS.

HIGH STRENGTH BOLTS FOR STEEL TO STEEL CONNECTIONS SHALL BE ASTM A325N OR ASTM A490, INSTALLATION AND SPECIAL INSPECTION PER AISC SPECIFICATIONS. ALL A325N OR A490 BOLTS SHALL BE PRETENSIONED IN STANDARD BOLT HOLES UNLESS NOTED OTHERWISE ON PLANS. MINIMUM BOLT PRETENSION PER AISC 16.1 TABLE J3.1 UNLESS NOTED OTHERWISE. ACCEPTABLE PRETENSIONING METHODS ARE TURN-OF-NUT, CALIBRATED WRENCH, TWIST-OFF-TYPE (ASTM F3125), OR DIRECT-TENSION INDICATOR (ASTM F959) PER AISC SPECIFICATIONS.

STEEL ROOF DECKING:

ROOF DECKING SHALL BE 24 GAGE, MINI-V-BEAM DECK AS MANUFACTURED BY AEP OR ALTERNATE AS APPROVED BY THE ARCHITECT AND ENGINEER OF RECORD. DECKING TO HAVE THE FOLLOWING MINIMUM SECTION PROPERTIES:

	I	Sp	Sn	MINIMUM SHEAR CAPACITY
24 GA.	.0956 IN4	.1307 IN3	.1286 IN3	200#/FOOT

(**STEEL ROOF DECKING** CONTINUED ABOVE LEFT)

Digitally signed by John Headland
Date: 2023.09.26 08:49:06 -07'00'

SHUTLER CONSULTING ENGINEERS Inc.
12503 Bel-Red Road, Suite 100
Bellevue, Washington 98005
(425) 450-4075 FAX (425) 450-4076

DATE	DESCRIPTION
9-25-2023	PERMIT SET

KIRKBRIDE MAILBOX SHELTER

BLACK DIAMOND, WASHINGTON 98010

GENERAL NOTE, SPECIAL INSPECTION, PLAN & SECTIONS

ENGINEER:	JH
CHECKED BY:	JH
DATE:	9-20-2023
JOB No.:	23-01.60
SHEET No.:	S1.0

INSTRUCTIONS TO BIDDERS

1.0 BIDDER RESPONSIBILITY CRITERIA

A. It is the intent of Owner to award a contract to a responsible bidder submitting the lowest responsive bid. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by the Owner to submit documentation demonstrating compliance with the criteria. The bidder must:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable, have industrial insurance coverage for the bidder's employees working in Washington as required in Title 51 RCW; an employment security department number as required in Title 50 RCW; and a state excise tax registration number as required in Title 82 RCW;
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3);
5. Have received training on the requirements related to public works and prevailing wage under chapter 39.04.350 RCW and chapter 39.12 RCW or be listed as exempt by the department of labor and industries on its website; and
6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW;
7. Before award of a public works contract, a bidder shall submit to the contracting agency a signed statement in accordance with RCW 9A.72.085 verifying under penalty of perjury that the bidder is in compliance with the responsible bidder criteria requirement of subsection A, 6 of this section.

1.1 SUBCONTRACTOR RESPONSIBILITY

A. The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this section apply to all subcontractors regardless of tier.

B. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable, have:

    a. Have Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;
    b. A Washington Employment Security Department number, as required in Title 50 RCW;

c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
d. An electrical contractor license, if required by Chapter 19.28 RCW;
e. An elevator contractor license, if required by Chapter 70.87 RCW.

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3);
5. Have received training on the requirements related to public works and prevailing wage under chapter 39.04.350 RCW and chapter 39.12 RCW or be listed as exempt by the department of labor and industries on its website; and
6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

1.2 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

A. RCW 39.04.350(2) specifically authorizes municipalities to adopt relevant supplement criteria for determining bidder responsibility applicable to a particular project which the bidder must meet.

B. For the work in this project a responsible/qualified Bidder must meet the following standards:

1. Have a current certificate of registration as a contractor, in compliance with chapter 18.27 RCW, for the last three years under the same business name;
2. Have a good record of past performance that includes, but is not limited to, high quality work, ability to complete projects on time, contractor's integrity, compliance with public policy, financial, contractual and tax obligations, as well as Federal and State rules and regulations in performing construction contracts.
3. Have a current Experience Modification Rate (EMR) of 1.0 or less, or an average EMR rate of 1.0 or less over the last three years. The requirement may, at the Owner's sole discretion, be waived on review of a written explanation that includes details of accidents, L&I records, a Loss Ratio Report for the last five years, costs, dates of events, and changes that have been made by the contractor to reduce accidents. A current company Safety Plan shall also be reviewed.
4. Bidder shall provide evidence of previous successful completion of site development projects, of similar scope and complexity. Poor performance, lack or response, or failure to complete projects successfully within the contract time may be grounds for the rejection of bidder.

C. Subcontractors shall have had three years minimum experience licensed in Washington State in the specific specialty contracting business.

1.3 PREPARATION OF BIDS – CONSTRUCTION

A. Bids must be submitted on the Bid Form furnished by the Owner.

B. All fields and questions on required forms must be fully answered and complete. Failure to do so may result in the bid being declared non-responsive.

C. The Bid shall comply with the following requirements:

1. Pursuant to RCW 39.30.060, the Bidder shall provide names of the Subcontractors with whom the Bidder will subcontract for performance of heating, ventilation and air conditioning (HVAC), plumbing, and electrical.
2. The Bidder can name itself for the performance of the work.
3. The Bidder shall not list more than one Subcontractor for each category of work identified.
4. Failure of the Bidder to list Subcontractors or to name itself to perform such work shall render the Bidder's bid nonresponsive and, therefore, void.

D. Bidders shall acknowledge receipt of all addenda to this solicitation by inserting the addenda numbers in the space provided on the Bid Form. Failure to do so may result in the bid being declared non-responsive.

1. Bidder is responsible for checking KCHA's website for addenda prior to submitting bid.

E. In order for a bid to be considered responsive, bidders must submit the following signed documents with their bid package:

1. Bid Form
2. Bidder's Information Form
3. Bid Guarantee

F. The Bidder agrees to hold the base bid prices for sixty (60) days from date of bid opening.

1.4 BID GUARANTEE

A. A bid guarantee in the amount of 5% of the base bid amount is required. Failure of the bidder to provide bid guarantee shall render the bid non-responsive.

B. Acceptable forms of bid guarantee are: A bid bond or postal money order, or certified check or cashier's check made payable to King County Housing Authority.

C. The Owner will return bid guarantees (other than bid bond) to unsuccessful bidders as soon as practicable, but not sooner than the execution of a contract with the successful bidder. The successful bidder's bid guarantee will be returned to the successful bidder with its official notice to proceed with the work of the contract.

1.5 AMENDMENTS TO INVITATION TO BID

A. If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

B. Bidders shall acknowledge receipt of all addenda to this solicitation by inserting the addenda numbers in the space provided on the Bid Form. Failure to do so may result in the bid being declared non-responsive.

1. Bidder is responsible for checking KCHA's website for addenda prior to submitting bid.
2. Addenda will not be issued later than three (3) calendar days before the deadline for receipt of Bids except Addendum withdrawing the request for Bids or extending the deadline for receipt of Bids.

1.6 PRE-BID MEETING

A. All potential bidders are strongly encouraged to attend. Oral statements may not be relied upon and will not be binding or legally effective.

1.7 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE

A. Before submitting a bid, the Bidder shall carefully examine each component of the Contract Documents prepared for the Work and any other available supporting data so as to be thoroughly familiar with all the requirements.

B. The Bidder shall obtain copies of all agencies and associations guidelines and standards cited in the Contract Documents and necessary to perform the Work, including full size reproductions of material provided by Owner, at their own expense.

C. The Bidder shall make a thorough and reasonable examination of the project site, facility and conditions under which the Work is to be performed, including but not limited to: Building access; resident occupancy; fire lanes; landscaping; obstacles and character of materials which may be encountered; traffic conditions; public and private utilities; the availability and cost of labor; and available facilities for transportation, handling, and storage of materials and equipment.

1.8 EXPLANATION TO PROSPECTIVE BIDDERS

A. Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Owner seven (7) calendar days before the bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Questions shall be submitted to:

Michelle Jackson
King County Housing Authority
600 Andover Park W
Seattle, WA 98188
Email: MichelleJ@kcha.org

1.9 PREVAILING WAGES

A. Contractor shall pay no less than the Washington State Department of Labor and Industries (L&I) prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of L&I. The schedule of prevailing wage rates for the locality or localities of the Work is determined by the Industrial Statistician of L&I. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

1. L&I prevailing wage rates may be found at https://lni.wa.gov/licensing-permits/public-works-projects/prevailing-wage-rates/
2. The Owner has determined that the work does not meet the definition of residential construction.
3. The prevailing wage rates publication date is determined by the bid due date.
4. The work is to be performed in King County.
5. A copy of the prevailing wage rates is available at KCHA.
6. A copy of the prevailing wage rates may be mailed on request.

1.10 TAXES

A. All taxes imposed by law shall be included in the bid amount. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

B. The retail sales tax does not apply to the gross contract price.

C. Prime and subcontractors are required to pay retail sales tax upon all purchases of materials, including prefabricated and precast items, equipment, leases or rentals of tools, consumables, and other tangible personal property which is installed, applied, attached, or otherwise incorporated in their work.

1.11 ASSURANCE OF COMPLETION

A. Payment and performance bonds for 100% of the Contract Sum, including all Change Orders and taxes imposed by law, shall be furnished for the Work, and shall be in a form acceptable to the Owner.

1.12 BID ERROR

A. In the event Bidder discovers an error in its bid, the Bidder may, under certain conditions and if before the date and time that bids are due, modify, their bid, as detailed below:

1. Prior to Date and Time Bids are Due:

a. A Bidder may withdraw its bid at any time prior to the date and time bids are due upon written request.
b. After withdrawing an original submitted bid, a Bidder may modify and resubmit its bid at any time prior to the date and time bids are due.

2. After the Date and Time Bids are Due:

a. A bidder who submits an erroneous low bid may withdraw the bid. The bid withdrawal is permissible if there was an obvious error in the low bid, and the mistake is readily apparent from the bid itself.
b. Notification: Provide to the Owner, within 24 hours of bid opening, written notification of the bidder's intent to withdraw the bid due to error.
c. Documentation: Provide to the Owner within 48 hours of bid opening, documentation sufficient in content to justify bid withdrawal to the satisfaction of the Owner. Include description and evidence of the error.
d. Approval: the Owner will approve or reject the request for withdrawal in writing.
e. Any low bidder who withdraws its bid is prohibited from bidding on the same project if it is subsequently re-solicited.

1.13 ADDITIVE OR DEDUCTIVE BID ITEMS

A. The low bid, for purposes of award, shall be the lowest responsive bid from a qualified responsible bidder offering the low aggregate amount for the base bid, plus additive or deductive bid alternates selected by the Owner.

1.14 BID EVALUATION

A. Responsive Bids: A bid will be considered responsive if it meets the conditions of the solicitation, in addition to but not limited to the following requirements:

1. Bid is received not later than the time and date specified.
2. Bid is submitted in the proper format on the form(s) provided.
3. Bid includes the complete scope of work as defined in bid package.
4. Bid does not include any exclusions or qualifications.
5. Bid includes Unit and Lump Sum Costs as listed in Proposal Form.
6. Forms are complete.

B. After bid opening, bids will be checked for correctness of bid item prices, extensions and the total bid price. Discrepancies shall be resolved by accepting the bid item prices and the corrected extensions and total bid price.

C. Responsible Bidders: the Owner will award contracts only to responsible bidders who demonstrate the ability to successfully perform under the terms and conditions as set forth in the Contract Documents and have successfully completed projects similar in scope and complexity.

1. Bidders must demonstrate relevant experience on similar types of projects and submit detailed information as required on the Bidder Information Form.

D. The Owner reserves the right to contact references and investigate past performance and qualifications of the Bidder, subcontractor, and project team members, including contacting third parties and/or the references provided by the Bidder.

1. The Owner may contact references for other projects including those the Bidder did not identify and/or provided references.
2. References may be asked to rate the performance of and describe their experience with project team members and subcontractors. Bidder Information may be solicited and evaluated on the following subjects: type and features of work; overall quality of project performance and quality of work; experience and technical knowledge and competence of the Bidder and Project Team Members; ability, capacity and skill to perform the Work; ability to manage submittals, requests for information, prevailing wage filings, and other paperwork; compliance with laws, ordinances, and contract provisions; and other information as deemed necessary.
3. Poor reference(s) may be justification to determine a Bidder is not responsible.

E. At the Owner's request, provide any additional explanation or information, which would assist in evaluating the qualifications of the Bidder, subcontractors, project team members, and bid price.

F. The Owner will verify information submitted and if the lowest bidder is determined to be “not responsible,” the Owner will issue, in writing, the specific reasons for this determination. The bidder may appeal this decision. The appeal must be in writing and shall be delivered to the Owner within two business days. The appeal may include additional information that was not included in the original bid documents. KCHA will make a final determination after the receipt of the appeal. The final determination may not be appealed.

1.15 CONTRACT AWARD

A. Bonding and Insurance: Contract award will be contingent on ability to secure payment/performance bonding, and Contractor's ability to meet the Owner insurance requirements as detailed in the Bid Documents.

B. Must, for the duration of the contract, procure and maintain Builders Risk insurance as stated in Part 2 of the General Conditions. This shall be in addition to General Liability, Automobile Liability, and Professional Liability/Errors and Omissions (if applicable) Coverage.

C. Bonding, insurance certificate with endorsements, and an approved Statement of Intent to Pay Prevailing Wages shall be submitted to the Owner within 14 days of contract award. A Notice to Proceed shall be issued immediately after receipt.

D. Right to Reject Bids/Waiver: The Owner reserves the right to reject any or all bids or to waive any informalities or irregularities in the bidding.

E. Retainage Funds: The Owner will not pay interest to the Contractor for accounts where retainage funds are maintained by the Owner. As part of the procurement by which the Contractor was selected for this work, the Contractor agrees to waive any other options and has made allowances for this waiver.

GENERAL CONDITIONS

PART 1 - GENERAL PROVISIONS

1.1 DEFINITIONS

A. “Authority Having Jurisdiction (AHJ)”: A federal, state, local, or other regional department, or an individual such as a fire official, labor department, health department, building official, or other individual having statutory authority.

B. "Contract Documents" means the Instructions to Bidders, Specifications, Plans, General Conditions, Prevailing Wage Rates, Bid Form, Contract Form, other Special Forms, Drawings and Specifications, and all Addenda and modifications thereof.

C. "Contract Sum" is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents.

D. "Contract Time" is the number of consecutive Days allotted in the Contract Documents for achieving completion of the Work.

E. "Contracting Officer" means the person delegated the authority by King County Housing Authority to enter into, and/or terminate this Contract. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer.

F. "Contractor" means the person or other entity entering into the Contract with King County Housing Authority to perform all of the services or work required under the Contract.

G. "Day" means calendar day, unless otherwise specified.

H. "Final Acceptance" means the acceptance by Owner that the Contractor has completed the requirements of the Contract Documents.

I. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment in the Contract Time, including, but not limited to, unusually severe weather conditions which could not have been reasonably anticipated.

J. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

K. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

L. "Liquidated Damages" means the amount prescribed in the Contract Documents to be deducted from any payments due or to become due Contractor, for each day's delay in completion of the Work beyond the time allowed in the Contract Documents as stated in the Notice to Proceed, plus any extensions of such time.

M. "Manager" means the person who is an authorized agent of the King County Housing Authority to administer the Contract.

N. "Notice to Proceed" means a notice from Owner to Contractor that defines the date on which the Contract Time begins to run.

O. "Owner" means the King County Housing Authority or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.

P. "Property Manager" means the property management company, its officers and employees.

Q. "Provide": Furnish and install, complete and ready for the intended use.

R. "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a Subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime Contract or a subcontract.

S. "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another Subcontractor.

T. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

1.2 EXECUTION AND INTENT

A. The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Contract Documents.

B. All work is to be executed in accordance with the Building Codes, as adopted by the Authority Having Jurisdiction, and other applicable codes and generally accepted industry standards. All products and materials are to be new and handled and applied in accordance with the manufacturer's recommendations.

C. Contractor makes the following representations to Owner:

1. The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;
2. Contractor has carefully reviewed the Contract Documents, had an opportunity to visit and examine the Project site, has become familiar with the local conditions in which the Work is to be performed, and has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, permits, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof.

D. The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

PART 2 - INSURANCE AND BONDS

2.1 INSURANCE REQUIREMENTS FOR BUILDING TRADES CONTRACTORS

A. Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property that may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or Subcontractors.

2.2 MINIMUM SCOPE OF INSURANCE

A. Contractors shall maintain coverages no less than:

1. Insurance Services Office Commercial General Liability coverage including Products/Completed Operations.
2. Insurance Services Office covering Automobile Liability, code 1 (any auto).
3. Workers' Compensation insurance as required by State law and Employer's Liability Insurance.
4. Builders Risk (Property / Course of Construction insurance covering for all risks of loss for all projects in excess of $250,000.00).

2.3 MINIMUM LIMITS OF INSURANCE

A. Contractor shall maintain limits no less than:

1. General Liability: $1,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit of $2,000,000.
2. Automobile Liability: $1,000,000 per accident for bodily injury and property damage.
3. Employer's Liability: $1,000,000 per accident for bodily injury/sickness or disease.
4. Builder Risk (Property) / Course of Construction: Completed value of project.

2.4 DEDUCTIBLES AND SELF INSURED RETENTION

A. Any deductibles or self-insured retentions must be declared to and approved by the Owner. At the option of the Owner, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its officers, officials, employees and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the Owner guaranteeing payment of losses and related investigations, claim administration and defense expenses. **NOTE: If this contract deals with hazardous materials or activities (i.e. lead based paint, asbestos, armed security guards) additional provisions covering those exposures must be included in order to protect the Owner's interests.**

2.5 OTHER INSURANCE PROVISIONS

A. The policies are to contain, or be endorsed to contain, the following provisions:

1. The Owner, the Property Manager, its officers, officials, employees, partners, agents and volunteers are to be covered as additional insureds under a "completed operations" type of additional insured endorsement with respect to general liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts or equipment furnished in connection with such work or operations. The endorsement(s) effectuating the foregoing additional insured coverage shall be ISO form CG 20 10 11 85, or CG 20 10 10 01 issued concurrently with CG 20 37 10 01, or their equivalent as long as it provides additional insured coverage, without limitation, for completed operations; (ii) automobile liability arising out of vehicles owned, leased, hired, or borrowed by or on behalf of the Contractor; (iii) any insurance written on a claims made basis, shall have a retroactive date that coincides with, or precede, the commencement of any work under this contract. Evidence of such coverage shall be maintained for a minimum of six (_6_) years beyond the expiration of the project.
2. King County will not accept Certificates of Insurance Alone. Improperly Completed Endorsements will be returned to your insured for correction by an authorized representative of the insurance company.
3. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects the Owner, its officers, officials, agents, partners, employees, and volunteers. Any insurance or self-insurance maintained or expired by the Owner, its officers, officials, agents, partners, employees, volunteers, or shall be excess of the Contractor's insurance and shall not contribute with it. King County Housing Authority's Insurance is Non-Contributory in Claims Settlement Funding.
4. The "General description of agreement(s) and/or activity(s) insured" shall include reference to the activity and/or to either specific King County Housing Authority's; project of site name, contract number, lease number, permit number or construction approval number.
5. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled or materially changed, except after thirty (30) days' [ten (10) days for non-payment of premium] prior written notice by certified mail, return receipt requested, has been given to the Owner.
6. Maintenance of the proper insurance for the duration of the contract is a material element of the contract. Material changes in the required coverage or cancellation of the coverage shall constitute a material breach of the contract.
7. Builders Risk / Course of Construction policies shall contain the following provisions:

    a. The King County Housing Authority shall be named as loss payee.
    b. The insurer shall waive all rights of subrogation against the Owner and the Property Manager, its officers, officials, employees and volunteers.

2.6 ACCEPTABILITY OF INSURERS

A. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A-:VII. The name of the Insurance Company underwriting the coverage and its address shall be noted on the endorsement form. Contractors must provide written verification of their insurer's rating.

2.7 VERIFICATION OF COVERAGE

A. Contractor shall furnish the Owner with original certificates and amendatory endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the Owner before work commences in sufficient time to permit contractor to remedy any deficiencies. The Owner reserves the right to require complete, certified copies of all required insurance policies or pertinent parts thereof, including endorsements affecting the coverage required by these specifications at any time.

2.8 SUBCONTRACTORS

A. Subcontractors shall include the Contractor as additional insured under their policies. All coverage's for subcontractors shall be subject to all of the requirements stated herein. Contractor shall be responsible for the adequacy of required coverages for subcontractors, and compile related certificates of insurance and endorsements evidencing subcontractors' compliance.

2.9 PAYMENT AND PERFORMANCE BONDS

A. Payment and performance bonds for 100% of the Contract Award Amount shall be furnished for the Work, using the Payment Bond and Performance Bond form AIA – form A312. Change order increases of cumulative 15% increments require revisions to the bond to match the new Contract Sum.

2.10 RIGHT OF WAY BOND

A. The type and amount of security will be pursuant to code or, if not specified, be at a minimum of $10,000 or 125 percent of the value of the work prerformed, whichever is greater, at the discretion of the City of Black Diamond. Types of securities include, but are not limited to, a bond with a surety qulaifed to do a bonding business in this state.

PART 3 - PERFORMANCE

3.1 CONTRACTOR CONTROL AND SUPERVISION

A. Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, and shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.

B. Contractor shall enforce strict discipline and good order among Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Owner may, by Notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.

C. The Contractor shall perform on the site, and with its own organization, work equivalent to at least 12% of the total amount of work to be performed under the contract.

D. Work Hours: The Contractor's allowable hours of operation shall be limited to those hours between 8:00 A.M. and 6:00 P.M. Monday to Friday excluding public holidays.

3.2 PERMITS, FEES, AND NOTICES

A. Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and coordinate inspections necessary for proper execution and completion of the Work. Prior to final payment, the approved, signed permits shall be delivered to Owner.

3.3 PREVAILING WAGES

A. Statutes of the State of Washington RCW 39.12 as amended shall apply to this contract. Requirements, in brief, are stated below:

1. There shall be paid each laborer or mechanic of the Contractor or sub-Contractor engaged in work on the project under this contract in the trade or occupation listed in the schedule of Wage Rates, as determined by the Department of Labor and Industries, not less than the hourly wage rate listed therein, regardless of any contractual relationship which may be alleged to exist between the Contractor and any sub-contractor and such laborers and mechanics.
2. The "prevailing rate or wage" contained in the wage determination include health and welfare fund contributions and other fringe benefits collectively bargained for by the various management and labor organizations. Prevailing wages shall be paid based on the most recent semi-annual list as required by the Department of Labor and Industries (L&I).
3. In case any dispute arises as to what are the prevailing rates for wages of work of a similar nature, and such disputes cannot be resolved by the parties involved, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries of the State of Washington, and the Director’s decision shall be final and conclusive and binding on all parties involved in the dispute.

B. Before commencing the Work, Contractor shall file a statement of “Intent to Pay Prevailing Wages.”

C. After completion of the Work, Contractor shall file an “Affidavit of Wages Paid.”

3.4 EQUAL EMPLOYMENT OPPORTUNITY

A. During performance of the Work:

1. Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, the presence of any physical, sensory, or mental disability, sexual orientation, Vietnam-era veteran status, disabled veteran status or political affiliation, nor commit any unfair practices as defined in RCW 49.60.
2. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, of any physical, sensory, or mental disability, sexual orientation, Vietnam-era veteran status, disabled veteran status, or political affiliation.
3. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and orders in regard to Equal Employment Opportunity including but not limited to Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and the rules, regulations, and orders of the Secretary of Labor. The Contractor shall include the terms of this Clause in every subcontract so that such term shall be binding on each Subcontractor.
4. Non-Discrimination R.C.W. 49.60: These special requirements establish minimum requirements for affirmative action and are intended to define and implement the basic discrimination provisions of these specifications. Failure to comply with these requirements may constitute grounds for application of contract default.

3.5 SAFETY PRECAUTIONS

A. In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoid work interruptions. For these purposes, the Contractor shall:

1. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the

contractor and each subcontractor on the work site. The Contractor shall submit a site-specific safety plan to the Owner's representative prior to the initial scheduled construction meeting.

2. Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, staging, runways, hoist, construction elevators, shoring, temporary lighting, grounded outlets, wiring, hazardous materials, vehicles, construction processes, and equipment required by Chapter 19.27 RCW, State Building Code (Uniform Building, Electrical, Mechanical, Fire, and Plumbing Codes); Chapter 212-12 WAC, Fire Marshal Standards, Chapter 49.17 RCW, WISHA; Chapter 296-155 WAC, Safety Standards for Construction Work; Chapter 296-65 WAC; WISHA Asbestos Standard; WAC 296-62-071, Respirator Standard; WAC 296-62, General Occupation Health Standards, WAC 296-24, General Safety and Health Standards, WAC 296-24, General Safety and Health Standards, Chapter 49.70 RCW, and Right to Know Act.
3. Comply with the State Environmental Policy Act (SEPA), Clean Air Act, Shoreline Management Act, and other applicable federal, state, and local statutes and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.
4. Post all permits, notices, and/or approvals in a conspicuous location at the construction site.
5. Provide any additional measures that the Owner determines to be reasonable and necessary for ensuring a safe environment in areas open to the public. Nothing in this part shall be construed as imposing a duty upon the Owner to prescribe safety conditions relating to employees, public, or agents of the Contractors.

B. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

C. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information. At a minimum, Contractor shall inform persons working on the Project site of:

   a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;
   b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and
   c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.

2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:

   a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
   b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;
   c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and
   d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

D. Hazardous, toxic or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to

regulation as, hazardous, toxic, dangerous, or harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as "hazardous substances"), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored on the Project site.

2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

E. Public safety and traffic: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

F. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

G. No duty of safety by Owner: Nothing provided in this section shall be construed as imposing any duty upon Owner with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

3.6 INDEPENDENT CONTRACTOR

A. The Contractor and Owner agree the Contractor is an independent contractor with respect to the services provided pursuant to this Contract. Nothing in this Contract shall be considered to create a relationship of employer and employee between the parties hereto. Neither the Contractor nor any employee of the Contractor shall be entitled to any benefits accorded Owner employees by virtue of the services provided under this Contract. The Owner shall not be responsible for withholding or otherwise deducting federal income tax or social security or contributing to the State Industrial Insurance Program, or otherwise assuming the duties of an employer with respect to the Contractor, or any employees of the Contractor.

3.7 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site.

C. Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Final Acceptance, and shall repair or replace without cost to Owner any damage or loss that may occur.

3.8 PRIOR NOTICE OF EXCAVATION

A. Prior to any excavation Contractor shall engage a locate service for all underground facilities or utilities. Contractor shall pay all fees for locator services and pay for all damages caused by excavation.

3.9 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no

event later than seven Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 5.

3.10 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES, AND IMPROVEMENTS

A. Contractor shall protect from damage all existing conditions, including soils, structures, equipment, improvements, utilities, and vegetation at or near the Project site; and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents, any defects of equipment, material, workmanship or design furnished by the Contractor, or failure by Contractor or subcontractor at any tier to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.

B. New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the Specifications.

3.11 MATERIAL AND EQUIPMENT

A. All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of Owner, is equal to that named in the Specifications, unless otherwise specifically provided in the Contract Documents.

B. Substitutions shall be considered where qualities and attributes including, but not limited to, cost, performance, weight, size, durability, visual effect, and specific features and requirements indicated are deemed equal or better by the Owner at the Owner's sole discretion. All requests for substitutions shall be made in writing to Owner and shall not be deemed to be approved unless approved in writing by Owner.

3.12 CORRECTION OF NONCONFORMING WORK

A. Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Final Acceptance.

B. If Contractor fails to correct nonconforming Work, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

3.13 CLEAN UP

A. Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

3.14 SUBCONTRACTORS AND SUPPLIERS

A. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified.

B. By appropriate written agreement, Contractor shall require each Subcontractor to be bound to Contractor by terms of those Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

C. Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

D. It is the Contractor's responsibility to pay its Subcontractors and material suppliers on a timely basis. The Owner reserves the right to withhold a portion of the Contractor's payment if the Contractor fails to make timely payments to the Subcontractors and material suppliers.

E. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Owner and any Subcontractor; or any persons other than Owner and Contractor.

F. The Contractor shall not enter into any subcontract with any subcontractor who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or by any state, territory, or municipality.

3.15 INDEMNIFICATION

A. The Contractor hereby agrees to indemnify, defend, and hold harmless the Authority, its successors and assigns, director, officers, officials, employees, agents, partners and volunteers (all foregoing singly and collectively (Indemnities") from a and against any and all claims, losses, harm costs, liabilities, damages and expenses, including, but not limited to, reasonable attorney's fees arising or resulting from the performance of the services, or the acts or omissions of the Contractor its successors, and assigns, employees, subcontractors or anyone acting on the contractor's behalf in connection with this Contract or its performance of this Contract.

B. Provided, however, that the Contractor will not be required to indemnify, defend, or save harmless the indemnitee as provided in the preceding paragraphs of this section if the claim, suit, or action for injuries, death, or damages is caused by the sole negligence of the indemnitee. Where such claims, suites, or actions result from the concurrent negligence of (a) the indemnitee or the indemnitee's agents or employees and (b) the Contractor or the Contractor's agent or employee, the indemnity provisions provided in the proceeding paragraphs of this section shall be valid and enforceable only to the extent of the Contractor's negligence or the negligence of its agents and employees..

C. The foregoing indemnity is specifically and expressly intended to constitute a waiver of the Contractor's immunity under Washington's Industrial Insurance act, RCW Title 51. The parties acknowledge that these provisions were specifically negotiated and agreed upon by them. If any portion of this indemnity clause is invalid or unenforceable, it shall be deemed excised and the remaining portions of the clause shall be given full force and effect.

D. The Contractor hereby agrees to require all its Subcontractors or anyone acting under its direction or control or on its behalf in connection with or incidental to the performance of this Contract to execute an indemnity clause identical to the preceding clause, specifically naming the Owner as indemnity, and failure to do so shall constitute a material breach of this Contract by the Contractor.

3.16 PROHIBITION AGAINST LIENS

A. The Contractor is prohibited from placing a lien on the Owner's property. This prohibition shall apply to all subcontractors of any tier and all materials suppliers, in accordance with RCW 35.82.190.

3.17 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages

1. Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. The liquidated damage amounts set forth will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from any payments to the Contractor.
2. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed.

3.18 WAIVER AND SEVERABILITY

A. The failure or delay of either party to insist on performance of any provision of the Contract, or to exercise any right or remedy available under the Contract, shall not be construed as a waiver of that provision, right, or remedy in any later instance. Waiver or breach of any provision of the Contract shall not be construed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Contract, unless the Contract is modified pursuant to the Clause entitled “Contract Modifications” herein.

B. If any provision of the Contract is or becomes void or unenforceable by operation of law, the remaining provisions shall be valid and enforceable.

PART 4 - PAYMENTS AND COMPLETION

4.1 CONTRACT SUM

A. The Contract Sum shall include all taxes imposed by law and properly chargeable to the Project, including sales tax. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

B. The retail sales tax does not apply to the gross contract price.

C. Prime and subcontractors are required to pay retail sales tax upon all purchases of materials, including prefabricated and precast items, equipment, leases or rentals of tools, consumables, and other tangible personal property which is installed, applied, attached, or otherwise incorporated in their work.

4.2 APPLICATION FOR PAYMENT

A. At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an Application for Payment for Work completed in accordance with the Contract Documents. Each application shall be supported by such substantiating data as Owner may require.

B. Each invoice shall include the following statement: “I hereby certify that the items listed are proper charges for materials, merchandise or services provided to the King County Housing Authority, and that all goods and/or services have been provided; that prevailing wages have been paid in accordance with the approved statements of intent filed with the Department of Labor and Industries; and that sub-contractors and/or suppliers have been paid, less earned retainage, as their interest appears in the last payment received.”

C. Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Each Application for Payment shall be consistent with previous applications and payments.

D. Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including releases by Washington State Employment Security Department and Washington State Department of Revenue, Department of Labor & Industries, and consent of surety to release of the retainage.

E. Waivers of Lien: With each Application for Payment, submit conditional waivers lien from every entity who is lawfully entitled to file a lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

    a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

F. Final Payment Application: Submit final Application for Payment with releases and close out supporting documentation.

G. Approved payments shall be mailed to the Contractor within 30 days.

4.3 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

A. The Owner shall make a final inspection of the Work on receipt of (1) written notice from the Contractor that the Work is ready for final inspection and (2) a final Application for Payment. When the Owner finds the Work acceptable and fully performed under the Contract Documents, and the Contractor has delivered to the Owner all warranties, permits, and operations manuals, the Owner will issue a Notice of Final Completion.

B. Acceptance of final payment by Contractor, or any Subcontractor, shall constitute a waiver and release to Owner of all claims by Contractor, or any such Subcontractor, for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in PART 7 - .

PART 5 - CHANGES

5.1 CHANGE IN THE WORK

A. Owner may, at any time and without notice to Contractor's surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work shall be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Owner causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment shall be made as provided in 5.2 and 5.3.

B. Pending agreement on the terms of the Change Order, Owner may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Owner's approval.

C. The Contractor agrees that any change in the Contract Amount or Contract Time provided in a Change Order is full and complete compensation to the Contractor for the change(s) to the work, deleted work, modified work, direct or indirect impact on the Contractor's schedule, and for any equitable adjustment or time extension to which the Contractor may be entitled to in this Change Order, pursuant to the Contract between the Owner and Contractor.

5.2 CHANGE IN THE CONTRACT SUM

A. Change Order Pricing - Fixed Price: When the fixed price or time and materials method is used to determine the value of any Work covered by a Change Order, or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:

1. Contractor's Change Order proposal, or request for adjustment in the Contract Sum, shall be accompanied by a complete itemization of the costs, including labor, material, subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets with documentation in a form approved by Owner.
2. Any request for adjustment of Contract Sum shall include only the following items:

    a. Craft labor costs for Contractors and Subcontractors.

        1) Basic wages and benefits: Hourly rates and benefits according to applicable prevailing wages.

2) Direct supervision shall not to exceed 15% of the cost of direct labor. No supervision markup shall be allowed for a working supervisor's hours.
3) Worker's Insurance. Direct contributions to the State for industrial insurance, medical aid, and supplemental pension by the class and rates established by L&I.
4) Federal Insurance. Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.
5) Safety and small tools: 4% of the sum of the amounts calculated in (1), (2), and (3) above.

b. Material Costs: Material costs and applicable sales tax shall be developed from actual known costs, supplier quotations or standard industry pricing guides and shall consider all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.

c. Equipment Costs: Itemization of the type of equipment and the estimated or actual length of time the equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for equipment and applicable sales tax only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. The Date Quest Rental Rate (Blue Book) shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed 50% of the applicable rate.

d. Allowance for Overhead: This allowance shall compensate Contractor for all noncraft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time and any other cost incidental to the change in the Work. This allowance shall be strictly limited in all cases an amount not to exceed the following:

1) For Contractor, for any Work actually performed by Contractor's own forces, 16% of the cost.
2) For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 16% of the cost.
3) For Contractor, for any Work performed by its Subcontractor(s), 6% of the amount due each Subcontractor.
4) For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 5% of the amount due the sub-Subcontractor.

e. Allowance for Profit:

1) For Contractor or Subcontractor of any tier for work performed by their forces, 5% of the cost developed in accordance with subsections a, b & c above.
2) For Contractor or Subcontractor of any tier for work performed by a subcontractor of a lower tier, 5% of the Subcontractor cost.

f. Insurance or Bond Premium: The costs of any change or additional premium of Contractor's liability insurance and public works bond arising directly from the changed Work. The costs of any change in insurance or bond premium shall be added after overhead and profit are calculated.

B. Change Order Pricing - Unit Prices

1. Work on a unit-price basis as stated in the Specifications and at the price submitted in the Bid Form or as subsequently modified.

a. Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead and profit, and bond and insurance costs; and
b. Quantities must be supported by field measurement verified by Owner.

5.3 CHANGE IN THE CONTRACT TIME

A. The Contract Time shall only be changed by a Change Order. Contractor shall immediately notify Owner, and shall include any request for a change in the Contract Time in its Change Order proposal.

B. If the time of Contractor's performance is changed due to an act of Force Majeure, Contractor shall request for an equitable adjustment in the Contract Time in writing within 24-hours of the occurrence.

PART 6 - CLAIMS AND DISPUTE RESOLUTION

6.1 CLAIMS PROCEDURE

A. If the parties fail to reach agreement regarding any dispute arising from the Contract Documents, Contractor's only remedy shall be to file a Claim with Owner within 30 Days from Owner's final offer.

B. The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may be entitled. It shall be fully substantiated and documented.

C. After Contractor has submitted a fully-documented Claim, Owner shall respond, in writing, to Contractor with a decision within 30 Days from the date the Claim is received.

D. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Owner's written decision as set forth above shall be final and conclusive as to all matters set forth in the Claim.

E. Any Claim of the Contractor against the Owner for damages, additional compensation, or additional time, shall be conclusively deemed to have been waived by the Contractor unless timely made in accordance with the requirements of this section.

6.2 ARBITRATION

A. If Contractor disagrees with Owner's decision rendered in accordance with paragraph 6.1C, Contractor shall provide Owner with a written demand for arbitration. No demand for arbitration of any such Claim shall be made later than 30 Days after the date of Owner's decision on such Claim; failure to demand arbitration within said 30 Day period shall result in Owner's decision being final and binding upon Contractor and its Subcontractors.

1. Notice of the demand for arbitration shall be filed with the American Arbitration Association (AAA), with a copy provided to Owner. The parties shall negotiate or mediate under the Voluntary Construction Mediation Rules of the AAA, or mutually acceptable service.

B. All Claims arising out of the Work shall be resolved by arbitration. The judgment upon the arbitration award may be entered, or review of the award may occur, in the superior court having jurisdiction thereof. No independent legal action relating to or arising from the Work shall be maintained.

6.3 CLAIMS AUDITS

A. All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim or to permit Owner access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.

1. In support of Owner audit of any Claim, Contractor shall promptly make available to Owner all records relating to the Work.

PART 7 - TERMINATION OF THE WORK

7.1 TERMINATION BY OWNER FOR CAUSE

A. Owner may, upon a written Notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:

1. Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Completion of the Work within the Contract Time;
2. Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;
3. Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;
4. Contractor repeatedly fails to supply skilled workers or proper materials or equipment;
5. Contractor repeatedly fails to make prompt payment due to Subcontractors, suppliers, or for labor;
6. Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or
7. Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Upon termination, Owner may at its option:

1. Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;
2. Finish the Work by whatever other reasonable method it deems expedient.

C. Owner's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 7.2B, and shall not be entitled to receive further payment until the Work is accepted.

E. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. Contractor shall also be liable for liquidated damages until such reasonable time as may be required for Completion. These obligations for payment shall survive termination.

F. Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. If Owner terminates Contractor for cause, and it is later determined that none of the circumstances set forth in 7.1A exist, then such termination shall be deemed a termination for convenience pursuant to 7.2.

7.2 TERMINATION BY OWNER FOR CONVENIENCE

A. Owner may, upon Notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

B. Unless Owner directs otherwise, after receipt of a Notice of termination for either cause or convenience, Contractor shall promptly:

1. Stop performing Work on the date and as specified in the notice of termination;
2. Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;
3. Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

PART 8 - MISCELLANEOUS PROVISIONS

8.1 RECORDS KEEPING AND REPORTING

A. The Contractor and all Subcontractors shall maintain accounts and records in accordance with State Auditor’s procedures, including personnel, property, financial and programmatic records which sufficiently and properly reflect all direct and indirect costs of any nature expended and services performed in the performance of this

Contract and other such records as may be deemed necessary by the Owner to ensure proper accounting for all funds contributed by the Owner to the performance of this Contract and compliance with this Contract.

B. The Contractor, and its Subcontractors, shall maintain these records for a period of six (6) years after the date of Final Acceptance.

8.2 AUDITS AND INSPECTIONS

A. The records and documents with respect to all matters covered by this Contract shall be subject at all times to inspection, review or audit by the Owner or any other government agency so authorized by law during the performance of this Contract. The Owner shall have the right to an annual audit of the Contractor's financial statement and condition.

8.3 ORGANIZATION CONFLICTS OF INTEREST

A. The Contractor warrants that to the best of its knowledge and belief and except as otherwise disclosed, it does not have any organizational conflict of interest which is defined as a situation in which the nature of work under this Contract and the Contractor's organizational, financial, contractual or other interests are such that:

1. Award of the Contract may result in an unfair competitive advantage; or
2. The Contractor's objectivity in performing the Contract work may be impaired.

B. The Contractor agrees that if after award they discover an organizational conflict of interest with respect to this Contract, they shall make an immediate and full disclosure in writing to the Contracting Officer, which shall include a description of the action, which the Contractor has taken or intends to take to eliminate or neutralize the conflict. The Owner may, however, terminate the Contract if it deems the action to be in the best interest of the Owner.

C. In the event the Contractor was aware of an organizational conflict of interest before the award of this Contract and intentionally did not disclose the conflict to the Contracting Officer, the Owner may terminate the Contract for default.

D. The provisions of this Clause shall be included in all subcontracts and consulting agreements wherein the work to be performed is similar to the services provided by the Contractor. The Contractor shall include in such subcontracts and consulting agreements any necessary provisions to eliminate or neutralize conflicts of interest.

8.4 INTERESTS OF MEMBERS OF CONGRESS

A. No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this Contract or to any benefit to arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

8.5 INTERESTS OF MEMBERS, OFFICERS, COMMISSIONERS AND EMPLOYEES, OR FORMER MEMBERS, OFFICERS AND EMPLOYEES

A. No member, officer, or employee of the King County Housing Authority, no member of the governing body of the locality in which the project is situated, no member of the governing body in which the Owner was activated, and no other public official or such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this Contract or the proceeds thereof.

BID FORM

PROJECT NAME AND LOCATION:

Rainier View Mobile Home Park **Contract Number: DW2402331**
Site Development

BID FORM

The undersigned, Legal Name of Bidder: _____

on this date: _____, 2024, having familiarized him/herself with the contract documents, site conditions, and has field verified all measurements contained in the project manual as prepared by the Owner, hereby proposes to furnish labor, materials and necessary equipment – all including, but not limited to, demolition, disposal, new installation and the required applicable taxes and fees to complete the work for the following bid amounts:

BASE BID _____ **($**_____**)**
(Including sales tax indicated in Instructions to Bidders)

ADDENDA _____
Acknowledge receipt of any addenda by inserting the number(s) above

In submitting this bid, it is understood that the right is reserved by the Owner to reject any and all bids. The undersigned hereby agrees that this proposal shall be a valid and firm offer for a period of One Hundred Eighty (180) calendar days from the date of Bid Opening.

Bidder agrees that Work will be substantially complete and ready for final payment in accordance with the Contract Documents on or before the date, within the number of calendar days indicated.

The undersigned Bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date for this Project, the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

_____ _____
Signature of Bidder Print Your Name

Submitted on _____ day of _____ 2024

_____ _____
City State

BIDDER INFORMATION

BIDDER INFORMATION

Name of Bidder (Company): _____

Address: _____

Contact Name: _____

Phone Number: _____ Email Address: _____

Business Type: General Contractor ( ) Other ( ) (Please specify): _____

Bidder is a(n): ☐ Individual ☐ Partnership ☐ Joint Venture ☐ Incorporated in the state of _____

List business names & associated UBI # used by Bidder during the past 5 years if different than above:

_____

Bidder has been in business continuously from: _____
Month, Year

Business License #: _____ Federal ID #: _____

Current UBI #: _____ Dept. of L&I Worker's Comp. Acct. #: _____

Bidder has experience in work "Similar in Scope and Complexity" comparable to that required for this Project:

As a prime contractor for _____ years. As a subcontractor for _____ years.

OWNER(S) OF COMPANY (List **all** owners):	OWNER'S SOCIAL SECURITY NUMBER (only required if sole proprietorship):

No. of regular full-time employees other than owner(s): _____

Indicate clearly the kind of work your company will actually perform in this project:

_____

Approximate % of work your company will actually perform:

List the supervisory personnel to be employed by the Bidder and available for, and intended to, work on this project:

Name	Title	How Long With Bidder
_____	_____	_____
_____	_____	_____

BIDDER INFORMATION

SUBCONTRACTORS

Do you intend to use Subcontractor(s) in this project? Yes ☐ No ☐ **See Instructions to Bidders, Part 1.3, C**

Subcontractors Name	Subcontractor's UBI#	Phone Number	Trade	Years in Business
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

BIDDER'S EXPERIENCE

Projects successfully supervised and completed by your company for work of similar scope and value as specified in bid documents in the last 5 years. Attach additional pages as necessary.

Name of Project	Completion Date	Duration (Months)	Nature of Work	Amount of Contract
1.				
2.				
3.				
4.				
5.				

Owner's Name (of project listed above)	Project Address	Contact Person	Phone Number
1.			
2.			
3.			
4.			
5.			

Has Bidder ever been found guilty of violating any State or Federal employment laws? ☐ No ☐ Yes
If yes, give details & attach additional pages as necessary: _____

_____

_____

BIDDER INFORMATION

Has Bidder ever filed for protection under any provision of the federal bankruptcy laws or state insolvency laws? ☐ No ☐ Yes. If yes, give details & attach additional pages as necessary: _____

_____

_____

Has any lien, claim and/or adverse legal action related to construction been rendered against Bidder in the past five years? (i.e., open claims, lawsuits, warrants, judgements including but not limited to those that would show on the L&I website) ☐ No ☐ Yes. If yes, give details & attach additional pages as necessary: _____

_____

_____

Has Bidder or any of its employees filed any claims with Washington State Worker's Compensation or other insurance company for accidents resulting in fatal injury or dismemberment in the past 5 years? ☐ No ☐ Yes. If yes, please state:

Date	Type of Injury	Agency Receiving Claim
_____	_____	_____
_____	_____	_____

Bidders current Experience Modification Rate (EMR): _____

(If Bidder is self-insured, attach proof of EMR stated, showing complete worksheet calculations)

The bidder hereby certifies that the information contained in this Bidder's Information is accurate, complete and current.

BY: _____ NAME: _____
(signature) (print)

TITLE: _____ DATE: _____

CONTRACT FORM

This Contract is entered into by and between the King County Housing Authority, hereinafter referred to as the "Owner" whose principal office is located at 600 Andover Park West, Seattle, WA 98188 and [Name of Contractor], referred to as the "Contractor", whose principal office is located at [Contractor's Address].

IN CONSIDERATION OF the mutual benefits and conditions hereinafter contained, the parties hereto agree as follows:

1.1 Contract Documents

A. The provisions set forth in the Contract Documents are hereby incorporated into and made part of the Contract. Contractor acknowledges receipt and review of all Contract Documents applicable to performance of the work. The Contract shall consist of the following component parts:

1. This Instrument
2. Addenda
3. Specifications
4. Appendix Information & Data
5. Site Plans
6. Bid Form
7. Pre-Bid Agenda
8. General Conditions
9. Instructions to Bidders
10. Prevailing Wage Rates
11. Performance and Payment Bonds

1.2 Scope of Services to be Performed by the Contractor: The Contractor shall provide all labor, materials, tools, equipment, transportation, supplies, and incidentals required to complete the work in accordance with the Contract Documents for:

Project: Rainier View Mobile Home Park Site Development Contract No.: DW2402331

1.3 Compensation: The total amount of the Contract shall be [$$$] dollars and [¢¢] cents ($[$$$.$$]) subject to additions and deductions provided therein.

1.4 Duration of Contract: The Contractor shall commence work after receipt of Notice to Proceed, follow the schedule specified in the contract documents, and all work must be completed within one hundred eighty (180) consecutive calendar days from the date of the Notice to Proceed unless sooner terminated pursuant to the General Conditions. Upon expiration of the original Contract term, the Contract, at the Owner's sole discretion, may be extended for a period determined by the Owner.

1.5 Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. If Completion of the Work does not occur within the Contract Time, the Contractor agrees that Liquidated Damages in the amount of **$250.00** per day will be assessed for each calendar day that the Contractor exceeds the time for completion.

The individuals signing this Contract warrant and represent for themselves and for their respective organizations that they are duly authorized to sign this Contract and that upon such signing their respective organizations are bound thereby.

DATED this _____ day of _____, 2024.

Contractor

_____
President/Owner

Owner

_____
Robin Walls
President/CEO
KING COUNTY HOUSING AUTHORITY

CERTIFICATE OF INSURANCE

DATE(MM/DD/YY)
Issue Date

PRODUCER
Vendor's Insurance Agent
Street Address
City, State, Zip
Phone Number

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
Vendor Name
Street Address
City, State, Zip

COMPANIES AFFORDING COVERAGE

COMPANY **A**	**ABC Insurance Company**
COMPANY **B**	**DEF Insurance Company**
COMPANY **C**	**GHI Insurance Company**
COMPANY **D**	

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH REPSECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	**GENERAL LIABILITY** [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR [ ] OWNER'S & CONTRACTOR'S PROT	**XXX123**	**01/01/00**	**01/01/01**	GENERAL AGGREGATE PRODUCTS-COMP/OP AGG PERSONAL & ADV INJURY EACH OCCURRENCE FIRE DAMAGE (Any one fire) MED EXP (Any one person)	**2,000,000** **1,000,000** **1,000,000** **1,000,000** **50,000** **5,000**
B	**AUTOMOBILE LIABILITY** [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [ ] NON-OWNED AUTOS	**XXX456**	**01/01/00**	**01/01/01**	COMBINED SINGLE LIMIT BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE	**1,000,000**
	GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY-EA ACCIDENT OTHER THAN AUTO ONLY: EACH ACCIDENT AGGREGATE	
	EXCESS LIABILITY [ ] UMBRELLA FORM [ ] OTHER THAN UMBRELLA FORM				EACH OCCURRENCE AGGREGATE	
C	**WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY** THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: [ ] INCL [ ] EXCL	**XXX789**	**01/01/00**	**01/01/01**	[X] STATUTORY LIMITS EACH ACCIDENT DISEASE-POLICY LIMIT DISEASE-EACH EMPLOYEE	**1,000,000** **1,000,000** **1,000,000**
	ROW					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

King County Housing Authority is named as additional insured with respect to above general liability and auto coverage. Re: Contract #DW2402331. Insured's work/services provided at Rainier View Mobile Home Park, 32631 1st Avenue, Black Diamond, WA 98010.

CERTIFICATE HOLDER
King County Housing Authority
600 Andover Park West Seattle,
WA 98188-3326

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL **30** DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Signature of Insured's Agent

PROVIDE

GENERAL LIABILITY ENDORSEMENT

and

AUTO LIABILITY ENDORSEMENT