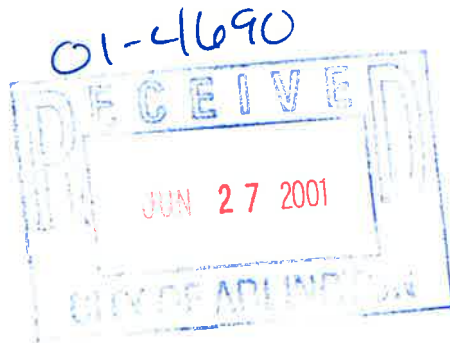


AN OFFICE/WAREHOUSE FACILITY FOR MIKE KING AND DKS CONSTRUCTION

67TH Ave. N.E. and 188th St. N.E., Arlington, WA
SW Quarter of Section 15, Township 31N, Range 5E, W.M.

Final Drainage Report
May 2001



JKA

John Knowles & Associates, Inc.
Civil Engineering
Project Management
Construction Management

PH: (253) 539-1400
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E-mail: jkacivil@nwrain.com

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AN OFFICE/WAREHOUSE FACILITY FOR MIKE KING AND DKS CONSTRUCTION

Final Drainage Report

Prepared for: Mike King
19012 61st Ave. N.E., Suite #5
Arlington, WA 98223
T: 1-877-778-5357

Date: May 2001

Prepared by: John Knowles & Associates, Inc.
P.O. Box 1328
Puyallup, WA 98371-0197
(253) 539-1400
(253) 539-1500 - Fax
jkacivil@nwrain.com

Date of Submittal: May 2001

JKA Project No.: 0028
JKA File No.: C:\winword\JEKfiles\0028.DR

Project Engineer's Certification:

I hereby state that this Drainage and Erosion/Sediment Control Plan for "An Office/Warehouse Facility for Mike King" has been prepared by me and under my supervision and meets the standard of care and expertise which are usual and customary in this community for professional engineers. I understand that City of Arlington does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

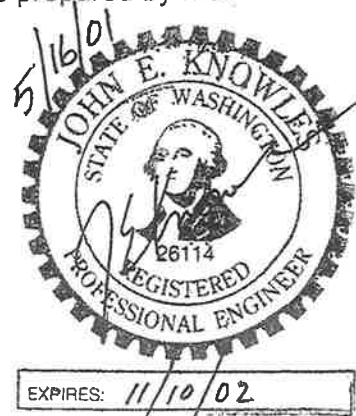


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III	Engineer's Construction Inspection Report Form
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PART I - PROJECT DESCRIPTION

SECTION I - PROPOSED PROJECT DESCRIPTION

Proponents have applied for appropriate land use permits and associated SEPA review for the construction of an approximately 17,000 sf office/open bays/warehouse/building with appurtenant parking and driveways. The improvements will be situated on the south end of the three-parcel property bounded by 67th Ave., 188th St., and BNSF railroad right-of-way. The three tax parcels are: 1531-054-017-0004; -018-0003; and -019-0002.

The property is located in Section 15, Township 31, Range 5, W.M. The 2.4-acre site is currently undeveloped. Current zoning is "industrial."

The proposal includes construction of appurtenant driveway, parking, and utility improvements. There will be a single vehicular access to 67th Ave. and a single vehicular access to 188th St. N.E.; these will be built to City of Arlington commercial driveway standards. The onsite storm drainage system, to serve building roofs and driveway areas, will be private with discharge to a treatment and control facility just north of the developed portion of the property. An interim facility for treatment and storage/infiltration of runoff is being designed by Earth Tech. A final permanent system will ultimately be constructed (as part of the City's 67th Ave. improvement project) to address both runoff from 67th Ave. (public) and the proposed project (private). (As of this writing, neither the conceptual design for the interim facility, nor the final design for the regional facility, have been completed by Earth Tech.)

Water for fire protection and domestic use will be brought to the site from the east side of 67th Ave. An additional connection to the City's water system will be made to the line in 188th St. for the extension of a fire hydrant lateral. The sanitary sewer service will be extended to the site from the east side of 67th Ave.

Improvements are limited to the south portion of the triangular-shaped site, with the goal of preserving the northern portion of the site for the City's regional stormwater treatment and control facility. A boundary line adjustment will be used to segregate the commercial development from the northern two parcels.

Proposed Stormwater System -

Please refer to the Hydrology Map in Appendix I and JKA civil plan Sheet C4 for the following discussion:

Runoff generated on the site will be collected and released as follows:

All onsite runoff (driveways, parking areas, roofs, and landscaping strips/islands) will be collected in the site's private stormwater drainage system, conveyed via underground piping within the driveways, and discharged to an interim storm drainage treatment and infiltration facility (designed by Earth Tech) located just north of the project. Basin summaries and conveyance calculations are enclosed in Appendix II, proving the adequacy of conveying 25-year peak runoff rates per the DOE Manual.

The treatment element of the facility will occur in the interim facility designed by Earth Tech. The intent is to remove the suspended solids and oils/greases from the runoff in a bioswale prior to reaching the infiltration basin. The bioswale will be lined with an impermeable liner to prevent infiltration.

The basin will have 3:1 or flatter side slopes and will be planted with vegetation appropriate for the soils and hydrology of the area. Infiltration was chosen as the stormwater disposal method due to the presence of the well-draining soils of the Everett and Lynnwood Series.

SECTION 2 - EXISTING CONDITIONS

The triangular-shaped site is bordered by 67th Ave., 188th St., and BNSF railroad right-of-way. Site topography is of low relief, with low points (elevation 147) near the central portion of the site, near the future pond location. The high point of the site is located on a localized mound (elevation 151) in the southwest portion of the site. The site is currently vegetated with Scot's Broom, blackberry vines, and grasses.

The only manmade drainage facilities near the site are associated with the relatively recent improvements to the east side of 67th Ave. These drainage improvements include catch basins equipped with silt trap TEEs with discharge to adjacent infiltration trenches. According to City staff, the proposed City-sponsored improvements in 67th Ave. will retrofit this storm drainage system such that all runoff will be directed to a regional stormwater treatment and infiltration facility; thus, the underground infiltration trenches will no longer be in use.

There are no manmade drainage facilities onsite.

SECTION 3 - INFILTRATION RATES/SOILS REPORT

The Soil Conservation Soil Survey of Snohomish County maps the onsite soils as Everett Gravelly Sandy Loam (majority of site) and Lynnwood Loamy Sand (southeast corner of site). Both soils are classified as Group 'A' soils by the SCS.

The feasibility of infiltrating the runoff in the infiltration pond is based upon five test pits that were logged by Murray-Tobiason, Inc. and included in their Preliminary Drainage Report for the previous project on the site that was not constructed. These soil logs confirm well-draining granular soils to significant depths, with no indication of mottling or high groundwater near the surface. Recent soils explorations by Nelson-Couvrette & Associates confirmed the earlier findings by Murray-Tobiason. Thus, JKA concurs with Earth Tech's conclusion that infiltration of runoff from this site is the most practical type of stormwater discharge.

SECTION 4 - WELLS AND SEPTIC SYSTEMS

The City of Arlington and City of Marysville will serve this project for water and sewer service, respectively. No onsite drinking wells or drainfields are known to exist onsite. If such wells or drainfields are found, they must be abandoned or removed in accordance with Snohomish Health Department well decommissioning/drainfield abandonment requirements.

SECTION 5 - FUEL TANKS

No underground fuel storage tanks are known to exist onsite. If any are found during final design or construction, they will be abandoned or removed in accordance with current WSDOE regulations.

SECTION 6 - SUB-BASIN DESCRIPTION

There is no significant offsite runoff tributary to this site. The north half of 188th and the west side of 67th Ave. sheets runoff toward the site, where it is then infiltrated adjacent to the road shoulders. As part of the 188th St. public improvements by the proponent and the 67th Ave. improvements by the City, this offsite runoff will be directed to the future 67th Ave. storm drainage system, with discharge to a regional treatment and infiltration facility designed by Earth Tech.

SECTION 7 - ANALYSIS OF 100-YEAR FLOOD

This site does not likely exist within a flood zone due to elevations of the site being close to the grades of the adjacent public roadways, and the well-draining characteristics of area soils per SCS mapping.

SECTION 8 - AESTHETIC CONSIDERATIONS FOR FACILITIES

The interim and permanent stormwater treatment basins and infiltration basin will be hydroseeded and/or landscaped. Other than the treatment and infiltration facility, all other elements of the storm drainage system will be underground in the form of Type 1 catch basins and piping.

SECTION 9 - DOWNSTREAM ANALYSIS

All runoff from storms up to 100-year frequency shall be collected onsite, stored, and discharged via infiltration. Thus, no discharge of runoff is anticipated to offsite properties or adjacent right-of-ways.

SECTION 10 - COVENANTS, DEDICATIONS, AND EASEMENTS

All drainage facilities, including underground piping, catch basins, stormwater treatment bioswale, and infiltration pond, will require routine maintenance. Responsibility for maintenance of the project conveyance system of catch basins and piping will lie with the project proponent and his successors/heirs. A detailed list of maintenance procedures and inspection checklists is included in the Maintenance Agreement for the project.

Landscaping-related maintenance responsibilities, such as mowing and irrigation, will also be the responsibility of the proponent.

Ultimately, the City will be responsible for the operation, maintenance, and ownership of the regional treatment and storage facilities serving the site and 67th Ave.

SECTION 11 - CONCLUSION

Every effort has been made during final design to comply with the current WSDOE Stormwater Management Manual requirements for stormwater collection and conveyance. By complying with state-of-the-art design criteria, stormwater systems for this project will minimize the impact of the development on downstream properties and the underlying aquifer with respect to erosion control, flood impacts, and water quality.

PART II – EROSION CONTROL

SECTION I – CONSTRUCTION SEQUENCE AND PROCEDURE

Project design includes site grading and erosion control measures to contain silt and soil within the project boundaries during construction until permanent erosion control is in place in the form of landscaping, hydroseeding, and roadway paving. Erosion/sediment control shall be achieved by a combination of structural and vegetative cover measures and construction practices tailored to fit the site. The civil plans by JKA, prepared for this project, address these improvements.

Best management practices (BMPs) will be employed to allow proper clearing and grading of the site and scheduling of construction activities. Before any construction begins onsite, appropriate erosion control facilities shall first be installed. The planned construction sequence shall be as follows:

1. Obtain City of Arlington Grading and/or Site Development Permit.
2. Install rock construction entrance at the permanent access location off 188th St. Use quarry spalls or rip rap in accordance with the "temporary rock construction entrance" detail included in the civil plans.
3. Designate an area for washing of equipment and concrete trucks to control runoff and to eliminate entry into the storm drainage systems and wetland buffers.
4. Install filter fabric fencing around lower portions of the site, as needed to inhibit silt-laden runoff from contaminating offsite areas and ditches.
5. Construct presettling basin to serve as temporary sedimentation trap (if necessary, the contractor shall consult the City Inspector for direction in this regard).
6. Clear developed areas of vegetation (grubbing and rough grading).
7. Install permanent stormwater collection and conveyance system, construct interim stormwater treatment/control facility, and fine grade site. Protect underground stormwater conveyance, storage, and treatment facilities from silt-laden runoff, using BMPs depicted on the final civil engineering plans.
8. During November 1st through March 31st, all disturbed areas greater than 5000 square feet that are subject to erosion shall be stabilized by mulch, hydroseeding, sodding, or plastic covering.
9. Complete construction of storm drainage facilities and other underground improvements.
10. Complete road improvements.
11. Place landscaping and hydroseed all disturbed areas. Complete perimeter and internal landscaping and buffer requirements so as to minimize long-term erosion potential.
12. Maintain all erosion control facilities until the entire site is stabilized and silt-laden runoff ceases.

SECTION 2 - TRAPPING SEDIMENT

The onsite soils belong to the Everett and Lynnwood series and have a potential for erosion. Filter fabric fencing shall be installed as needed to control erosion; the civil plans depict the location and provide details for fencing construction. A stabilized construction entrance will be installed with permanent access to the roadway to prevent vehicles from tracking soil away from the disturbed areas; if sediment is tracked offsite, sediment shall, on a daily basis, be swept or shoveled from the public roadway surface prior to washing down said pavement.

SECTION 3 - PERMANENT EROSION CONTROL AND SITE RESTORATION

All disturbed areas will be paved, surfaced with gravel, hydroseeded, covered with landscaping, or developed as building pad.

SECTION 4 - INSPECTION SEQUENCE

In addition to normal City inspections for grading and erosion control, the project engineer must be notified by the contractor to observe the facilities related to stormwater treatment, storage, and conveyance during construction. At a minimum, the following items should be observed at the time specified:

1. The following erosion control measures shall be installed by the contractor and inspected by the City before start of clearing and grading:
 - a) Construction entrance.
 - b) Filter fabric fences.
 - c) Stabilization measures such as straw, mulch, hydroseeding, plastic sheeting, etc. (as needed).

2. The contractor must notify the project engineer to observe construction of the project drainage facilities to ensure the following are in working order:
 - a) Catch basin and pipe conveyance system.
 - b) Stormwater ponds/basins.
 - c) Roof drainage tightlines.

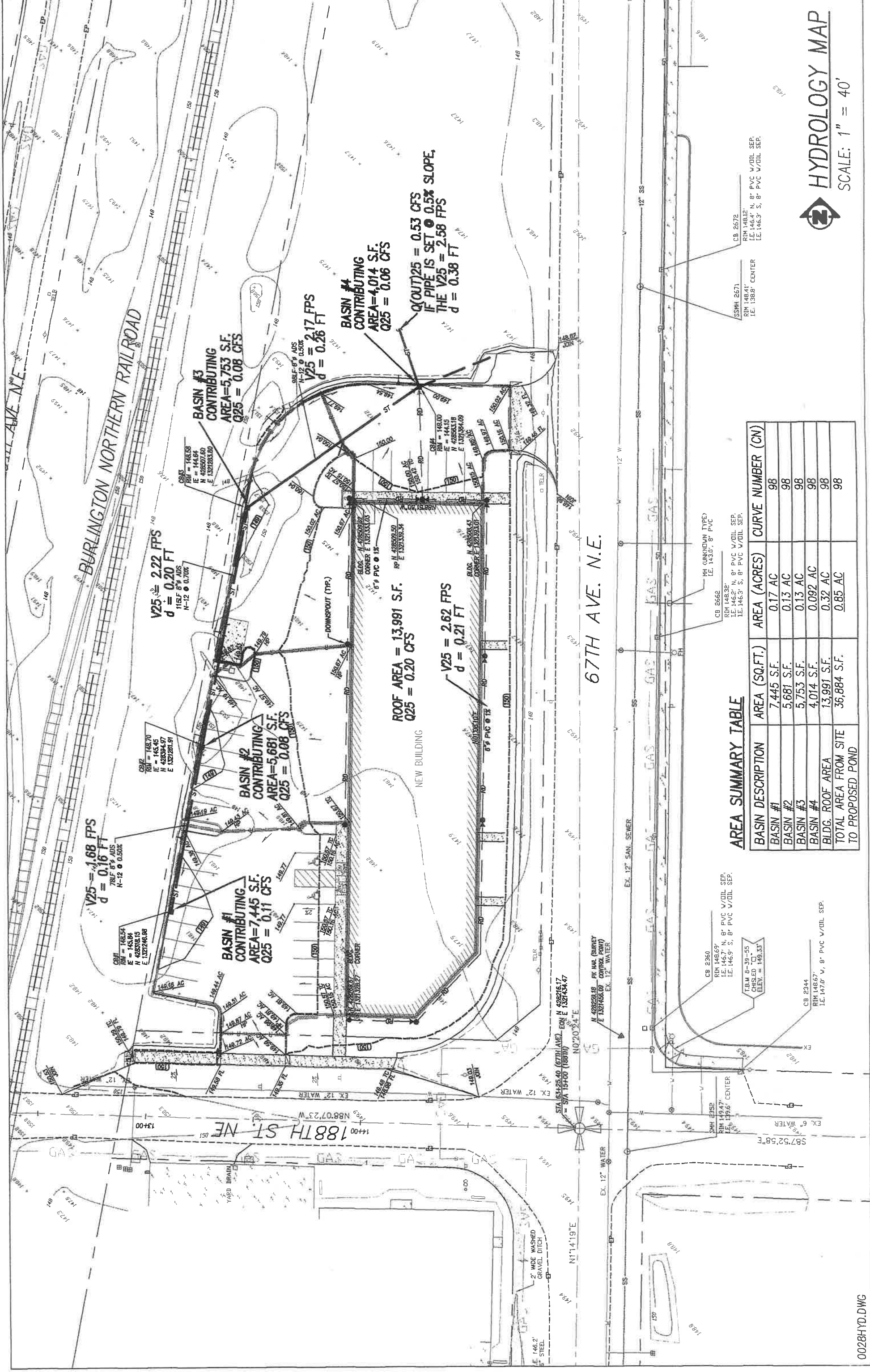
It is the responsibility of the contractor to inform the project engineer of the timing of the above construction phases. A final site visit will be performed to verify grades, drainage construction, and all of the necessary information to complete a project engineer's Project Observation Report. The owner is responsible for advising the contractor of his responsibility to notify the engineer regarding construction progress.

SECTION 5 - CONTROL OF POLLUTANTS OTHER THAN SEDIMENTS

Washout from concrete trucks shall not be dumped into the storm drainage system or onto soil or pavement, which carries stormwater runoff. Washout can be dumped into a designated area to be later backfilled or hardened and broken up for disposal into a landfill or concrete recycling facility. The owner shall designate a wash-down area for equipment and concrete trucks.

APPENDIX I

Hydrology Map



AREA SUMMARY TABLE

BASIN DESCRIPTION	AREA (SQ.FT.)	AREA (ACRES)	CURVE NUMBER (CN)
BASIN #1	7,445 S.F.	0.17 AC	98
BASIN #2	5,681 S.F.	0.13 AC	98
BASIN #3	5,753 S.F.	0.13 AC	98
BASIN #4	4,014 S.F.	0.092 AC	98
BLDG. ROOF AREA	13,991 S.F.	0.32 AC	98
TOTAL AREA FROM SITE TO PROPOSED POND	36,884 S.F.	0.85 AC	98

APPENDIX II

Final Drainage Calculations

Final Storm Drainage Calculations
Office / Warehouse Facility for DKS Construction
May, 2001

Criteria / References:

- WSDOE SWM Manual
- SCS Soils Mapping
- WaterWorks Software
- SBUH Method w/ Type 1a Storm

Area Summary:

Basin Description	Area (square feet)	Area (Acres)	Curve Number (CN)
Catch Basin #1	7,445 s.f.	0.17 Ac.	98
Catch Basin #2	5,681 s.f.	0.13 Ac.	98
Catch Basin #3	5,753 s.f.	0.13 Ac.	98
Catch Basin #4	4,014 s.f.	0.092 Ac.	98
Bldg. Roof Area	13,991 s.f.	0.32 Ac.	98
<u>Total Area from site to proposed pond</u>	36,884 s.f.	<u>0.85 Ac.</u>	98

(Note: There is a very small amount of landscaping that is tributary to the basins, but the entire area is assumed to be impervious for the calculations.)

The following is a list of the precipitation values used for the basin flow calculations:

6 month: P = 1.22 inches
 2 year: P = 1.90 inches
 25 year: P = 3.0 inches
 100 year: P = 3.9 inches

The precipitation values are based upon the isopluvial charts in the 1992 D.O.E. Stormwater Management Manual.

The following is a summary of the calculations of the flow contributing to the proposed storm pond:

$Q_{100\text{year}} = 0.69 \text{ c.f.s}$ $\text{Vol}_{100\text{year}} = 11,326 \text{ c.f.}$
 $Q_{2\text{year}} = 0.33 \text{ c.f.s}$ $\text{Vol}_{2\text{year}} = 5,227 \text{ c.f.}$
 $Q_{6\text{month}} = 0.20 \text{ c.f.s}$ $\text{Vol}_{6\text{month}} = 3,050 \text{ c.f.}$

The pages following this sheet are the computer print-outs for Waterworks (Computer Modeling software) and Flowmaster (Manning's flow calculator for pipes) to justify the conveyance pipe sizes.

=====

BASIN SUMMARY

BASIN ID: DEV25YR NAME: DEV 25 YR TO CITY POND

SBUH METHODOLOGY

TOTAL AREA.....:	0.85 Acres	BASEFLOWS:	0.00 cfs	
RAINFALL TYPE....:	TYPE1A		PERV	IMP
PRECIPITATION....:	3.00 inches	AREA...:	0.00 Acres	0.85 Acres
TIME INTERVAL....:	10.00 min	CN....:	0.00	98.00
		TC....:	0.00 min	5.00 min

ABSTRACTION COEFF: 0.20

PEAK RATE: 0.53 cfs VOL: 0.20 Ac-ft TIME: 480 min

11-5

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: ROOF DRAIN

Comment: ROOF TIGHTLINE PIPES

Solve For Actual Depth

Given Input Data:

Diameter.....	0.50 ft
Slope.....	0.0100 ft/ft
Manning's n.....	0.013
Discharge.....	0.20 cfs = <i>Q₂₅ Roof</i>

Computed Results:

Depth.....	0.21 ft
Velocity.....	2.62 fps
Flow Area.....	0.08 sf
Critical Depth....	0.22 ft
Critical Slope....	0.0074 ft/ft
Percent Full.....	41.25 %
Full Capacity.....	0.56 cfs
QMAX @.94D.....	0.60 cfs
Froude Number.....	1.17 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: P4

Comment: PIPE OUT OF CB#4

Solve For Actual Depth

Given Input Data:

Diameter.....	0.67 ft
Slope.....	0.0050 ft/ft
Manning's n.....	0.013
Discharge.....	0.53 cfs = $Q_{2.5}$

Computed Results:

Depth.....	0.38 ft
Velocity.....	2.58 fps
Flow Area.....	0.21 sf
Critical Depth....	0.34 ft
Critical Slope....	0.0071 ft/ft
Percent Full.....	56.53 %
Full Capacity.....	0.87 cfs
QMAX @.94D.....	0.93 cfs
Froude Number.....	0.82 (flow is Subcritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: P3

Comment: PIPE OUT OF CB#3

Solve For Actual Depth

Given Input Data:

Diameter.....	0.67 ft
Slope.....	0.0050 ft/ft
Manning's n.....	0.013
Discharge.....	0.27 cfs $\approx Q_{25}$

Computed Results:

Depth.....	0.26 ft
Velocity.....	2.17 fps
Flow Area.....	0.12 sf
Critical Depth....	0.24 ft
Critical Slope....	0.0065 ft/ft
Percent Full.....	38.35 %
Full Capacity.....	0.87 cfs
QMAX @.94D.....	0.93 cfs
Froude Number.....	0.87 (flow is Subcritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: P2

Comment: PIPE OUT OF CB#2

Solve For Actual Depth

Given Input Data:

Diameter.....	0.67 ft
Slope.....	0.0070 ft/ft
Manning's n.....	0.013
Discharge.....	0.19 cfs $\approx Q_{25}$

Computed Results:

Depth.....	0.20 ft
Velocity.....	2.22 fps
Flow Area.....	0.09 sf
Critical Depth....	0.20 ft
Critical Slope....	0.0064 ft/ft
Percent Full.....	29.17 %
Full Capacity.....	1.02 cfs
QMAX @.94D.....	1.10 cfs
Froude Number.....	1.04 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: P1

Comment: PIPE OUT OF CB#1

Solve For Actual Depth

Given Input Data:

Diameter.....	0.67 ft
Slope.....	0.0050 ft/ft
Manning's n.....	0.013
Discharge.....	0.11 cfs = Q_{25}

Computed Results:

Depth.....	0.16 ft
Velocity.....	1.68 fps
Flow Area.....	0.07 sf
Critical Depth....	0.15 ft
Critical Slope....	0.0065 ft/ft
Percent Full.....	24.07 %
Full Capacity.....	0.87 cfs
QMAX @.94D.....	0.93 cfs
Froude Number.....	0.88 (flow is Subcritical)

APPENDIX III

Engineer's Construction Inspection Report Form

ENGINEER'S CONSTRUCTION INSPECTION REPORT FORM

Project Name: An Office/Warehouse Facility for Mike King and DKS Construction

Project Number: City of Arlington

Location (address or other):

67th Ave. and 188th St. N.E., Arlington, WA

Tax Parcel Nos.: 153105-4-017-0004, 4-018-0003, and 4-019-0002

SW Quarter of Section 15, Township 31N:, Range 5E, W.M.

Pond Information:

1. **Type:** Open infiltration basin.
- 2(A). **After pond construction, have infiltration tests and/or soil logs been completed?**
- 2(B) **Indicate test results and compare with design criteria (pre-construction soils information). Do the post-construction values indicate a need to modify system design? Explain.**
3. **Outlet Type:** Disposal to ground via infiltration through native soil.
4. **Outlet works at correct elevation(s), filter fabric installed properly (if needed), etc.?**
5. **Spillway at correct elevation, slope, adequately armored, etc.?**

Conveyances:

1. **Channels properly graded, sloped, planted, etc.?**
2. **Sewers at proper grade, inlets as designed, trenches as designed, pipe bedding properly prepared, backfilling procedures correct, materials as specified, etc.?**

Roof Leaders:

1. **Do roof leaders drain to infiltration trenches or as shown on the approved plans?**

Erosion Control:

1. **Erosion facilities in place at the specified time relative to other construction?**

2. **Construction entrance pad as specified?**
3. **Did facilities keep sediment, mud etc. out of water bodies, wetlands, and from crossing the property boundary?**
4. **Are permanent erosion control measures in place and as designed?**

Signature and Seal

I, or someone under my direct supervision, has adequately inspected the project *after* construction, and to the best of my knowledge the project was built according to the approved plan and specifications except as noted above.

Signature/Date: _____

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APPENDIX IV

Maintenance Agreement

After Recording, please return to:

John Knowles & Associates, Inc.
P.O. Box 1328
Puyallup, WA 98371

COMMERCIAL AGREEMENT TO MAINTAIN
STORMWATER FACILITIES AND TO IMPLEMENT A
POLLUTION SOURCE CONTROL PLAN
BY AND BETWEEN

DKS Construction

THEIR HEIRS, SUCCESSIONS, OR ASSIGNS
(HEREINAFTER "OWNERS")

AND

CITY OF ARLINGTON

(HEREINAFTER "JURISDICTION")

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) is essential to the protection of water resources. All property owners are expected to conduct business in a manner that promotes environmental protection. This Agreement contains specific provisions with respect to maintenance of stormwater facilities and use of pollution source control BMPs.

LEGAL DESCRIPTION: **Parcel Nos. : 153105-4-017-0004; -018-0003; and -019-0002**

Whereas, the Owners have constructed improvements, including, but not limited to, buildings, pavement, and stormwater facilities on the property described above. In order to further the goals of the Jurisdiction to ensure the protection and enhancement of water resources, the Jurisdiction and the Owner hereby enter into this Agreement. The responsibilities of each party to this Agreement are identified below.

OWNER SHALL:

- (1) Implement the stormwater facility maintenance program included herein as Attachment "A".
- (2) Implement the pollution source control program included herein as Attachment "B".

- (3) Maintain a record (in the form of a log book) of steps taken to implement the programs referenced in (1) and (2) above. The log book shall be available for inspection by appointment at 18802 67th Ave. N.E., Arlington, Washington. The log book shall catalog the action taken, who took it, when it was done, how it was done, and any problems encountered or follow-on actions recommended. Maintenance items ("problems") listed in Attachment "A" shall be inspected as specified in the attached instructions or more often if necessary. The Owners are encouraged to photocopy the individual checklists in Attachment "A" and use them to complete its inspections. These completed checklists would then, in combination, comprise the log book.
- (4) Submit an annual report to the Jurisdiction regarding implementation of the programs referenced in (1) and (2) above. The report must be submitted on or before May 15th of each calendar year and shall contain, at a minimum, the following.
 - (a) Name, address, and telephone number of the businesses, the persons, or the firms responsible for plan implementations, and the person completing the report.
 - (b) Time period covered by the report.
 - (c) A chronological summary of activities conducted to implement the programs referenced in (1) and (2) above. A photocopy of the applicable sections of the log book, with any additional explanation needed, shall normally suffice. For any activities conducted by paid parties, include a copy of the invoice for services.
 - (d) An outline of planned activities for the next year.

THE JURISDICTION SHALL:

- (1) Maintain all stormwater system elements in the public rights-of-way, such as bioswales, catch basins, oil-water separators, pipes, and infiltration basins.
- (2) Provide technical assistance to the Owner in support of its operation and maintenance activities conducted pursuant to its maintenance and source control programs. Said assistance shall be provided upon request and as Jurisdiction time and resources permit.
- (3) Review the annual report and conduct a minimum of one (1) site visit per year to discuss performance and problems with the Owner.
- (4) Review this Agreement with the Owner and modify it as necessary at least once every three (3) years.

REMEDIES

- (1) Execute periodic major maintenance on the stormwater facilities in accordance with Attachment A.

- (2) If the Jurisdiction determines that maintenance or repair work is required to be done to the stormwater facilities located in the subdivision, the Jurisdiction shall give the Owner notice of specific maintenance and/or repair required. The Jurisdiction shall set a reasonable time in which such work is to be completed by the persons who were given notice. If the above-required maintenance and/or repair is not completed within the time set by the Jurisdiction, written notice will be sent to the Owner stating the Jurisdiction's intention to perform such maintenance and bill the Owner for all incurred expenses.
- (3) If, at any time, the Jurisdiction determines that the existing system creates any imminent threat to public health or welfare, the Jurisdiction may take immediate measures to remedy said threat. No notice to the persons listed in Remedies (1) above shall be required under such circumstances. All other Owner responsibilities shall remain in effect.
- (4) The Owner shall grant unrestricted authority to the Jurisdiction for access to any and all stormwater system features for the purpose of performing maintenance or repair as may become necessary under Remedies (1) and/or (2).
- (5) The Owner shall assume responsibility for the cost of maintenance and repairs to the stormwater facility, except for those maintenance actions explicitly assumed by the Jurisdiction in the preceding section. Such responsibility shall include reimbursement to the Jurisdiction within 90 days of the receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments. If legal action ensues, any costs or fees incurred by the Jurisdiction will be borne by the parties responsible for said reimbursements.

This Agreement is intended to protect the value and desirability of the real property described above and to benefit all the citizens of the Jurisdiction. It shall run with the land and be binding on all parties having or acquiring any right, title, or interest, or any part thereof, of real property in the subdivision. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of all citizens of the Jurisdiction.

Owner

Owner

STATE OF WASHINGTON)
) SS
COUNTY OF SNOHOMISH)

On this day and year above personally appeared before me, _____
and _____, known to be the individuals described and who executed
the foregoing instrument and acknowledge that they signed the same as their free and
voluntary act and deed for the uses and purposes therein mentioned.

Given under my hand and official seal this _____, day of _____, 2001.

Notary Public in and for the State of
Washington, residing in _____
My commission expires: _____

STATE OF WASHINGTON)
) SS
COUNTY OF SNOHOMISH)

On this day and year above personally appeared before me, _____
and _____, known to be the individuals described and who executed
the foregoing instrument and acknowledge that they signed the same as their free and
voluntary act and deed for the uses and purposes therein mentioned.

Given under my hand and official seal this _____, day of _____, 2001.

Notary Public in and for the State of
Washington, residing in _____
My commission expires: _____

ATTACHMENT "A"

Maintenance Checklist for Catch Basins and Inlets

Frequency	Drainage System Feature	√	Problem	Conditions to Check For	Conditions That Should Exist
M,S	General		Trash, debris, and sediment in or on basin.	Trash or debris in front of the catch basin opening is blocking capacity by more than 10%.	No trash or debris is located immediately in front of catch basin opening. Grate is kept clean and allows water to enter.
M				Sediment or debris (in the basin) that exceeds 1/3 the depth from the bottom of basin to invert of the lowest pipe into or out of the basin.	No sediment or debris in the catch basin. Catch basin is dug out and clean.
M				Trash or debris in any inlet or pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
M			Structural damage to frame and/or top slab	Corner of frame extends more than 3/4 inch past curb face into the street (if applicable)	Frame is even with curb.
M				Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure all material is running into the basin).	Top slab is free of holes and cracks.
M				Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab.	Frame is sitting flush on top slab.

A			Cracks in basin walls/bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A				Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe. Contact a professional engineer for evaluation.
A			Settlement/ mis-alignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
M,S			Fire hazard or other pollution	Presence of chemicals such as natural gas, oil, and gasoline. Obnoxious color, odor, or sludge noted.	No color, odor, or sludge. Basin is dug out and clean.
M,S			Outlet pipe is clogged with vegetation	Vegetation or roots growing in inlet/outlet pipe joints that is more than 6" tall and less than 6" apart.	No vegetation or root growth present.

If you are unsure whether a problem exists, please contact a professional engineer.

Comments:

KEY

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms (use 1-inch in 24 hours as guideline)

ATTACHMENT "A" (CONTINUED)

Maintenance Checklist for **Conveyance Systems** (Pipes, Ditches, and Swales)

Frequency	Drainage System Feature	√	Problem	Conditions to Check For	Conditions That Should Exist
M,S	Pipes		Sediment & debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
M			Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
A			Damaged (rusted, bent or crushed)	Protective coating is damaged, rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
M				Any dent that significantly impedes flow (i.e., decreases the cross section area of pipe by more than 20%).	Pipe repaired or replaced.
M				Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
M,S	Open ditches		Trash & debris	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam and coated paper.	Remove trash and debris and dispose as prescribed by the County.

M			Sediment buildup	Accumulated sediment that exceeds 20% of the design depth.	Ditch cleaned of all sediment and debris so that it matches design.
A			Vegetation	Vegetation (e.g., weedy shrubs or saplings) that reduces free movements of water through ditches.	Water flows freely through ditches. Grassy vegetation shall be left alone.
M			Erosion damage to slopes	See Ponds Checklist.	See Ponds Checklist.
A			Rock lining out of place or missing (if applicable)	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standard.
Varies	Catch basins			See Catch Basins Checklist.	See Catch Basins Checklist.
M,S	Swales		Trash & debris	See above for Ditches.	See above for Ditches.
M			Sediment buildup	See above for Ditches.	Vegetation may need to be replanted after cleaning.
M			Vegetation not growing or overgrown	Grass cover is sparse and seedy or areas are overgrown with woody vegetation.	Aerate soils and reseed and mulch bare areas. Maintain grass height at a minimum of 6 inches for best stormwater treatment. Remove woody growth, recontour, and reseed as necessary.
M,S			Erosion damage to slopes	See Ponds Checklist.	See Ponds Checklist.

M			Conversion by homeowner to incompatible use	Swale has been filled in or blocked by shed, woodpile, shrubbery, etc.	If possible, speak with homeowner and request that swale area be restored. Contact the County to report problem if not rectified voluntarily.
A			Swale does not drain	Water stands in swale or flow velocity is very slow. Stagnation occurs.	A survey may be needed to check grades. Grades need to be in 1-5% range if possible. If grade is less than 1%, underdrains may need to be installed.

If you are unsure whether a problem exists, please contact the Jurisdiction and ask for technical assistance.

Comments:

Key: A = Annual (March or April preferred)
M = Monthly
S = After major storms

ATTACHMENT "A" (CONTINUED)

Maintenance Checklist for Infiltration Systems

Frequency	Drainage System Feature	√	Problem	Conditions to Check For	Conditions That Should Exist
M,S	General		Trash & debris buildup in pond	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
M			Poisonous vegetation	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
M,S			Fire hazard or pollution	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
M			Vegetation not growing or is overgrown	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
M			Rodent holes	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
M			Insects	See Maintenance Checklist for Ponds.	See Maintenance Checklist for Ponds.
A	Storage area		Sediment buildup in system	A soil texture test indicates facility is not working at its designed capabilities or was incorrectly designed.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. A sediment trapping area is installed to reduce sediment transport into infiltration area.

A			Storage area drains slowly (more than 40 hours) or overflows	A soil texture test indicates facility is not working at its capabilities or was incorrectly designed.	Additional volume is added through excavation to provide needed storage. Soil is aerated and rototilled to improve drainage. Contact the County for information on its requirements regarding excavation.
M			Sediment trapping area	Any sediment and debris filling area of 10% of depth from sump bottom to bottom of outlet pipe or obstructing flow into the connector pipe.	Clean out sump to design depth.
One time			Sediment trapping area not present	Stormwater enters infiltration area directly without treatment.	Add a trapping area by constructing a sump for settling of solids. Segregate settling area from rest of facility. Contact the County for guidance.
M	Rock filters		Sediment and debris	By visual inspection little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.

If you are unsure whether a problem exists, please contact the Jurisdiction and ask for technical assistance.

Comments:

Key: A = Annual (March or April preferred)

M = Monthly

S = After major storms

ATTACHMENT "B"

Pollution Source Control Plan An Office/Warehouse Facility for Mike King and DKS Construction May 2001

JKA #0028

GENERAL GUIDELINES FOR HAZARDOUS MATERIALS HANDLING AND SOURCE CONTROL

MANAGING HAZARDOUS PRODUCTS

- Maintenance personnel should buy and use only what is needed. Leftovers need to be stored properly/safely reused, given away, recycled, or disposed of safely.
- Maintenance personnel should read labels and follow directions on the label. Hazardous products may be labeled:

Danger	Poisonous	Volatile
Combustible	Caustic	Explosive
Warning	Corrosive	Flammable
Caution		
- Maintenance personnel should keep products in original containers and always keep them well-labeled. If the product must be transferred to smaller containers, use the proper size funnel and avoid spills. Label all containers.
- Labels can fall off with weathering. To prevent, cover with transparent tape. To relabel, use a metal tag attached to the container or use a stencil and spray paint.
- Do not mix chemical substances unless recommended by the manufacturer.
- Use in well-ventilated areas. Protect skin, eyes, nose, and mouth when necessary by wearing gloves, respirator, or other protective clothing.
- Keep corrosive liquids away from flammable liquids.
- Look for nontoxic or less toxic options (check with the State Department of Ecology Office of Waste Reduction at 1-800-822-9933).
- Use all of the product before disposing of the container.
- There are private firms that specialize in the cleanup of spills.

EQUIPMENT WASHING

Thinners or solvents at not to be discharged into the sanitary or storm sewer systems when cleaning machine parts where discharge of water is required. Use alternative methods for cleaning larger equipment parts such as high pressure, high temperature water washes, or steam cleaning. Equipment washing wash water cannot be discharged into the storm or sanitary system.

Small parts can be cleaned with degreasing solvents which are reused after filtering or recycled. These solvents should not discharge into any sewer. Further information is available from the Department of Ecology.

SPILL CONTROL PLANNING AND CLEANUP

Any spill that occurs, regardless of the size and/or type of spill, should be reported to the following agencies:

- If the spill of a hazardous substance could reach surface waters, the following agencies must be notified (there are fines for failing to notify):

National Resource Center 1-800-424-8802 (24-hour)

- Locally, notify the regional Department of Ecology offices:

Northwest Region – Redmond 649-7000 (24-hour)

Southwest Region - Olympia 753-2353 (24-hour)

Notify the maintenance personnel in the event of a spill, particularly if it is hazardous. Follow manufacturer's specific clean-up instructions for different products handled on site. If a spill occurs, demobilize it as quickly as possible. If there is a chance that the spill could enter a storm drain or sewer, plug the inlet and turn off or divert any incoming water.

Cover the spill with absorbent material such as kitty litter or sawdust. Do not use straw. Dispose of the used absorbent per Ecology or manufacturer's instructions. If the spill is flammable, dispose of as directed by the local fire marshal.

SOURCE CONTROL

- Minimize use of commercial fertilizers. Use only that amount recommended by the manufacturer.
- Do not overwater lawn areas, causing excess runoff to the storm drainage system.
- Do not dispose of used motor oil, cleaning fluids, waste water, or any other substance to the catch basins, grass swales, or the ground in general.
- Recycle all motor oils and anti-freeze. Call TPCHD for recycling center locations.

MATERIALS USED AND WASTES GENERATED: Maintenance of grassed areas and landscaped vegetation has historically required the use of fertilizers and pesticides.

The application process can lead to inadvertent contamination of nearby surface waters by overuse, misapplications, or the occurrence of storms shortly after application. Heavy watering of surface greens in golf courses may cause pesticides or fertilizers to migrate to surface and shallow groundwater resources.

The application of pesticides and fertilizers generates water containers. Equipment must be cleaned and maintained. Maintenance shops where the equipment is maintained must comply with the BMPs specified under "Vehicle Maintenance Shops" (see WSDOE SWM Manual Section IV-2.4.9). The BMPs outlined below focus on the use of fertilizers and pesticides.

Source Control BMPs: The owner must comply with the BMPs S1.90 and S2.20 in WSDOE SWM Manual in Chapter IV-4 in the use of pesticides and herbicides.

Other BMPs

- Establish an Integrated Pest Management (IPM) Program (see BMP S1.90 in WSDOE SWM Manual Chapter IV-4). IPM can help to minimize the need for chemical pest control measures by providing optimum growing conditions for turf grasses.

Lawn Management

- Select the appropriate turfgrass mixture for your climate and soil type. Certain tall fescues and rye grasses resist insect attack because of symbiotic endophytic fungi found naturally in their tissues which repel or kill common leaf and stem-eating lawn insects. They do not, however, repel root-feeding lawn pests and are toxic to ruminants such as cattle and sheep. The fungus causes no known adverse effects to the host plant or to humans. Endophytic grasses are commercially available and can be used in areas such as parks or golf courses where grazing does not occur. The local Cooperative Extension office can offer advice on which types of grasses are best suited to the area and soil type.
- Lawns should be aerated regularly in areas of heavy use where the soil tends to become compacted. Aeration should be done while the grasses in the lawn are growing most vigorously.
- Thatching should generally be done when the layer of thatch becomes greater than 1/4" deep.
- While grass clippings cannot be left on many parts of a golf course, they can be collected and dispersed in the rough or other undeveloped (but not buffer) areas adjacent to the golf course. Clippings are relatively high in N (4%) and are a good source of nutrients as they decompose.
- Mowing is a stress-creating activity for turfgrass. When grass is mowed too short, its productivity is decreased and there is less growth of roots and rhizomes. The turf becomes less tolerant of environmental stresses, more disease prone and more reliant on outside means such as pesticides, fertilizers, and irrigation to remain healthy. Set the mowing height at the highest acceptable level and mow at times and intervals designed to minimize stress on the turf. Increased mowing tends to increase shoot density and leaf succulence. Increased water use has been observed with increased mowing height, but this water use may be offset by increased mowing frequency.

Irrigation

- The depth from which a plant normally extracts water depends on the rooting depth of the plant. Appropriately irrigated lawn grasses normally root in the top 6 to 12 inches of soil; lawns irrigated on a daily basis often root only in the top 1 inch of soil. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn

completely dependent on artificial watering. The amount of water applied depends on the normal rooting depth of the turfgrass species used, the available water holding capacity of the soil, and the efficiency of the irrigation system. Consult with either the local Soil Conservation office or Cooperative Extension office to help determine optimum irrigation practices.

Fertilizer Management

- Research suggests that turfgrass is most responsive to nitrogen fertilization, followed by potassium and phosphorus. Fertilization needs vary by site depending on plant, soil, and climatic conditions. Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization. For details on soils testing, contact the local Conservation District or Cooperative Extension Service.
- Fertilizers should be applied in the amounts appropriate to the vegetative requirements and at the time of year that minimizes losses to surface and groundwaters. Do not fertilize during a drought or when the soil is dry. Alternatively, do not apply fertilizers within three days prior to predicted rainfall. The longer the period between fertilizer application and either rainfall or irrigation, the less fertilizer runoff occurs. Use slow-release fertilizers such as methylene urea, IDBU, or resin-coated fertilizers when appropriate, generally in the spring. Use of slow-release fertilizers is especially important in areas with sandy or gravelly soils. Time the application to periods of maximum plant uptake. Research indicates that fall application of fertilizer nitrogen for the next growing season in cool moist climates should be discouraged.
- All fertilizer applications should be performed by properly trained persons. Fertilizers should not be applied to swales, filter strips, or buffer areas surrounding sensitive water bodies.

Use of Pesticides¹

- Properly maintained and healthy turfgrass will tolerate the presence of low levels of pest populations without suffering permanent damage. Healthy turfgrass will also recover more rapidly from major pest or disease infestations. Chemical controls should only be used when other methods have not worked. Use the safest pesticide which can appropriately control the target pest. The pesticide should have low mobility, high adsorption, and low persistence.
- Regular visual inspections should be done and spot pesticide applications then performed.
- All mixing and application should be done under the direct supervision of a licensed pesticide applicator. Applications should be performed in strict accordance with the instructions on the pesticide label. Contact the Pesticide Management Division of the Washington State Department of Agriculture if any questions arise.
- Prior to application, ascertain that no significant precipitation events are predicted within the next three days.

¹ The term "pesticide" here includes those substances commonly thought of as insecticides, fungicides, miticides, nematocides, herbicides, and rodenticides.

- Handle and store all pesticides according to the BMPs found in S1.30, S1.40, and S1.50 in Chapter IV-4. An emergency spill control plan should also be developed (see BMP S1.80 in Chapter IV-4).

For more information on pesticide application and disposal requirements for solid and hazardous wastes, see Step By Step: Fact Sheets for Hazardous Waste Generators, publication 91-12, available from Ecology's Regional Offices.

Weed Suppression

- Set weed tolerance levels for various areas of the golf course or park. Determine which weed species are currently growing in the areas and how aggressively they are growing or spreading. Determine how much damage they are likely to cause to other plants, structures, or the overall aesthetics of the area. Direct suppression efforts should be focused on weed populations that threaten to exceed tolerance levels rather than on all weeds growing in the area.
- A healthy lawn mowed regularly at the proper height is one of the best ways to suppress weeds. Regular mowing encourages lawn growth and discourages the growth of such species as crabgrass.