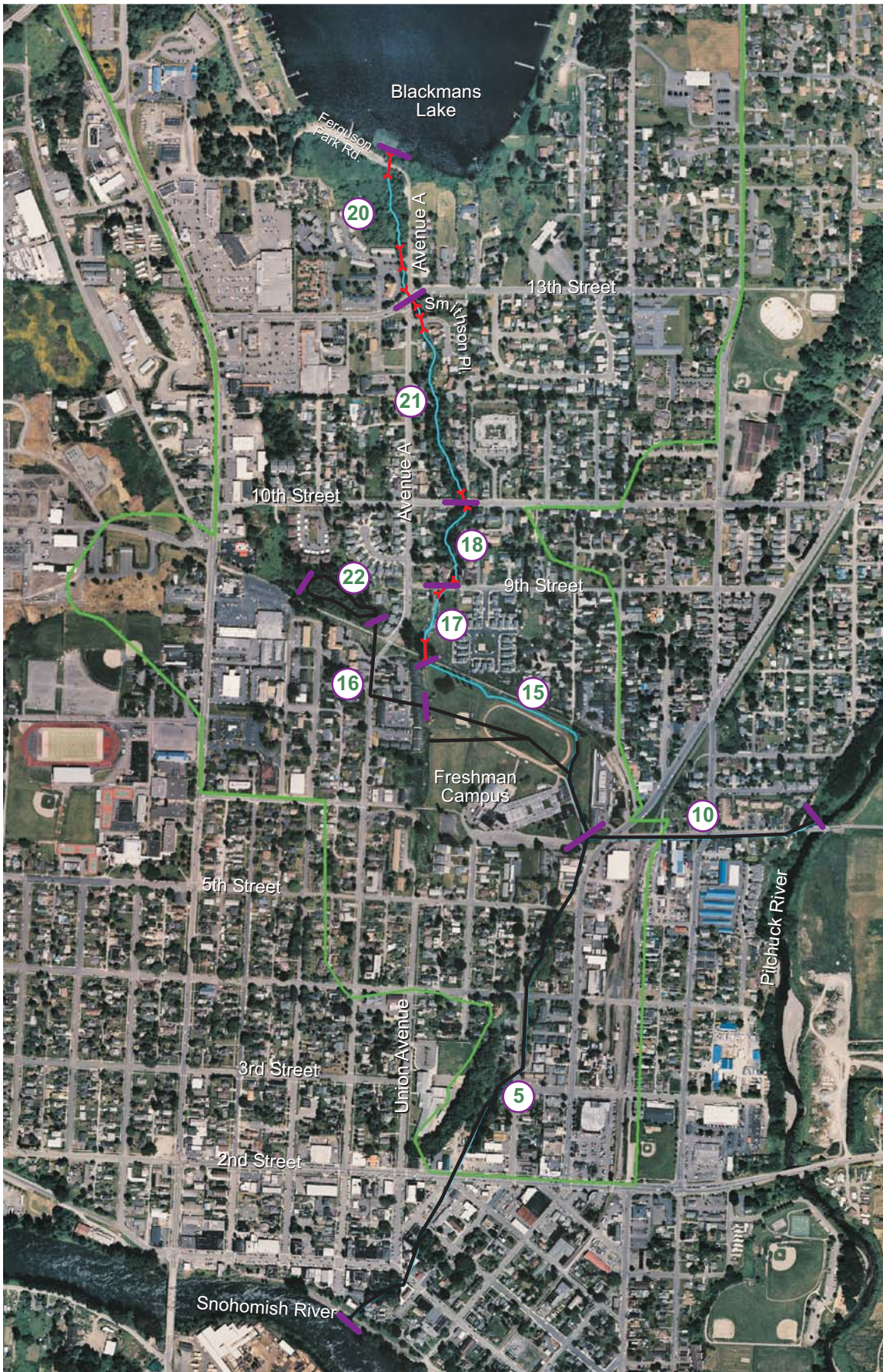







City of Snohomish
Blackmans Lake Level Evaluation; Summary of Outlet Analysis

ATTACHMENT 1.
REPRESENTATIVE HSPF INPUT DATA FILE

January 2008



LEGEND

-  Culvert
-  Open channel
-  Pipe
-  Drainage basin boundary
-  HSPF reach

3640015\FigA1_HSPF.schem.rh10



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City of Snohomish
**BLACKMANS LAKE LEVEL EVALUATION;
 SUMMARY OF OUTLET ANALYSIS**

Figure A-1.
 HSPF MODEL SCHEMATIC

RUN

GLOBAL

CITY OF SNOHOMISH Blackmans Lake FUTURE LAND USE MODEL, OPTION 3 Outlet

*** Option 3 consists of the following:

- *** 1. Channel regraded to provide uniform slope from culvert invert to invert.
- *** 2. Culverts are open (unblocked). Culvert under 13th invert set at surveyed elevation that excludes sediment on the culvert bottom.
- *** 3. Opened channel geometry: base=4', top 8', depth 1' min
- *** 4. Weir control structure installed near driveway culvert
- *** 5. Winter weir elev = 140.7' (set November)
- *** Summer weir elev = 140.7' (set April) (i.e., one weir setting year-round)

*** This model originated from the 2001 Beck basin plan performed for the City. It was substantially revised from the original model as follows:

- *** 1. Model reduced to focus on Blackmans Lake. Original subbasin numbering maintained
- *** 2. Updated and expanded rainfall from Silverlake used (provided from Snohomish Co)
- *** 3. Calibrated PERLND parameters developed from the adjacent Cemetery Creek analysis from the Snohomish County DNR analysis were utilized. Slope subcategory ignored
- *** 4. Input structure updated from version 9.
- *** 5. Revised FTABLEs defining Blackmans Lake and the outlet channel.
- *** 6. Change from hourly to 15-minute time steps.
- *** 7. Replaced generic FTABLE with physically based FTABLES.
- *** 8. Replaced all FTABLES downstream of Blackmans Lake using new FTABLES developed from HEC-RAS and SWMM modeling.
- *** 9. Numerous other updates, mostly to provide additional output statistics.

*** Future Land Use - Option 3 outlet, otherwise existing conveyance

START 1948/10/01 01:00 END 2001/08/01 24:00

RUN INTERP OUTPUT LEVEL 3

RESUME 0 RUN 1 WDMFSL 16

END GLOBAL

OPN SEQUENCE

INGRP INDELT 0:15

PERLND 15

PERLND 17

PERLND 25

PERLND 27

PERLND 31

PERLND 41

PERLND 51

IMPLND 11

RCHRES 20

RCHRES 21

RCHRES 18

RCHRES 17

RCHRES 22

RCHRES 16

RCHRES 15

RCHRES 10

RCHRES 5

DURANL 201

DURANL 202

DURANL 203

DURANL 205

DURANL 210

DURANL 217

DURANL 218

DURANL 221

PLTGEN 1

END INGRP

END OPN SEQUENCE

FILES

```

<File> <Un#> <-----File Name----->***
<-ID->                                     ***
WDM      20   FuLUOpt3.wdm
MESSU    21   FuLUOpt3.ech
          30   Fue3pkQ.pks
          40   Fue3fldr.out
          60   Fue3prld.out

```

END FILES

PERLND

GEN-INFO

```

<PLS >      Name          NBLKS   Unit-systems   Printer          ***
# - #                User   t-series   Engl Metr          ***
                        in   out                ***
15      TF              1     1     1     1     60     0
17      TF/PASTURE      1     1     1     1     60     0
25      TG              1     1     1     1     60     0
27      O/PASTURE      1     1     1     1     60     0
31      OF              1     1     1     1     60     0
41      OG              1     1     1     1     60     0
51      WETLANDS       1     1     1     1     60     0

```

END GEN-INFO

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL  MSTL  PEST  NITR  PHOS  TRAC          ***
15  51  0   0   1   0   0   0   0   0   0   0   0   0

```

END ACTIVITY

PRINT-INFO

```

# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL  MSTL  PEST  NITR  PHOS  TRAC *****
11  51  0   0   5   0   0   0   0   0   0   0   0   0   1   9

```

END PRINT-INFO

PWAT-PARM1

```

<PLS > ***** Flags *****
# - # CSNO RTOP UZFG  VCS  VUZ  VNN  VIFW  VIRC  VLE          ***
15  51  0   0   0   0   0   0   0   0   0

```

END PWAT-PARM1

PWAT-PARM2

```

<PLS > ***
# - # ***FOREST      LZSN      INFILT      LSUR      SLSUR      KVARY      AGWRC
15      4.5000      0.0800      400.00      0.1000      0.5000      0.9960
17      4.5000      0.0600      400.00      0.1000      0.5000      0.9960
25      4.5000      0.0300      400.00      0.1000      0.5000      0.9960
27      5.0000      1.4000      400.00      0.0500      0.3000      0.9960
31      5.0000      2.0000      400.00      0.0500      0.3000      0.9960
41      5.0000      0.8000      400.00      0.0500      0.3000      0.9960
51      4.0000      2.0000      100.00      0.0010      0.5000      0.9960

```

END PWAT-PARM2

PWAT-PARM3

```

<PLS > ****
# - # *** PETMAX      PETMIN      INFEXP      INFILD      DEEPFR      BASETP      AGWETP
15      2.0000      2.0000      .00      0.      0.
17      2.0000      2.0000      .00      0.      0.
25      2.0000      2.0000      .00      0.      0.
27      2.0000      2.0000      .00      0.      0.
31      2.0000      2.0000      .00      0.      0.
41      2.0000      2.0000      .00      0.      0.
51      10.0000      2.0000      .00      0.      0.7

```

END PWAT-PARM3

PWAT-PARM4

```

      <PLS >                                     ***
      # - #      CEPSC      UZSN      NSUR      INTFW      IRC      LZETP***
      15      0.2000      0.5000      0.3500      6.000      0.5000      0.7000
      17      0.1000      0.2800      0.3000      6.000      0.5000      0.2500
      25      0.1000      0.2500      0.2500      6.000      0.5000      0.2500
      27      0.1000      0.5000      0.3000      0.000      0.7000      0.2500
      31      0.2000      0.5000      0.3500      0.000      0.7000      0.7000
      41      0.1000      0.5000      0.2500      0.000      0.7000      0.2500
      51      0.2000      3.0000      0.5000      1.000      0.7000      0.8000
END PWAT-PARM4
PWAT-STATE1
      <PLS > PWATER state variables***
      # - #***      CEPS      SURS      UZS      IFWS      LZS      AGWS      GWVS
      15      0.2      0.      1.0480      0.031      4.12      4.78      2.34
      17      0.1      0.      0.547      0.007      5.77      7.14      4.14
      25      0.1      0.      0.5470      0.045      4.32      2.59      .93
      27      0.1      0.      0.6530      0.      6.46      8.73      4.26
      31      0.2      0.      0.327      0.      6.90      6.85      3.95
      41      0.1      0.      0.9330      0.      7.02      9.04      4.13
      51      0.1      0.      2.3940      0.      6.07      4.72      2.9
END PWAT-STATE1
END PERLND

IMPLND
GEN-INFO
      <ILS >      Name      Unit-systems      Printer      ***
      # - #      User      t-series      Engl      Metr      ***
      in      out      ***
      11      IMPERVIOUS      1      1      1      6      0
END GEN-INFO
ACTIVITY
      <ILS > ***** Active Sections *****
      # - # ATMP SNOW IWAT SLD IWG IQAL ***
      11      0      0      1      0      0      0
END ACTIVITY
PRINT-INFO
      <ILS > ***** Print-flags ***** PIVL      PYR
      # - # ATMP SNOW IWAT SLD IWG IQAL *****
      11      0      0      6      0      0      0      1      9
END PRINT-INFO
IWAT-PARM1
      <ILS >      Flags      ***
      # - # CSNO RTOP      VRS      VNN      RTLI      ***
      11      0      0      0      0      0
END IWAT-PARM1
IWAT-PARM2
      <ILS >                                     ***
      # - #      LSUR      SLSUR      NSUR      RETSC      ***
      11      500.00      0.0100      0.1000      0.1000
END IWAT-PARM2
IWAT-PARM3
      <ILS >                                     ***
      # - #      PETMAX      PETMIN      ***
      11
END IWAT-PARM3
IWAT-STATE1
      <ILS > IWATER state variables      ***
      # - #      RETS      SURS      ***
      11      1.0000E-3      1.0000E-3
END IWAT-STATE1
END IMPLND
***
***

```

EXT SOURCES

*** WDM 5 PAN EVAPORATION puyallup, 0.75 pan factor is applied

*** WDM 2 is 15-minute Silver Lake precipitation

```
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # tem strg<-factor->strg <Name> # # <Name> # # ***
WDM      2 PREC      ENGLZERO          PERLND 11 51 EXTNL  PREC
WDM      2 PREC      ENGLZERO          IMPLND 11      EXTNL  PREC
WDM      2 PREC      ENGLZERO          RCHRES 20      EXTNL  PREC
WDM      5 EVAP      ENGLZERO 0.75      DIV  PERLND 11 51 EXTNL  PETINP
WDM      5 EVAP      ENGLZERO 0.75      DIV  IMPLND 11      EXTNL  PETINP
WDM      5 EVAP      ENGLZERO 0.75      DIV  RCHRES 20      EXTNL  POTEV
END EXT SOURCES
```

NETWORK

*** Subbasin area is expressed in acres/12 to maintain proper unit conversion.

*** Therefore, area=tabled value *12 =d acres

```
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
*** SUB-BASIN 5 RUNOFF FROM LAND SEGMENTS
PERLND 17 PWATER PERO 0.9523 RCHRES 20 EXTNL IVOL
PERLND 15 PWATER PERO 1.2217 RCHRES 20 EXTNL IVOL
PERLND 25 PWATER PERO 11.2125 RCHRES 20 EXTNL IVOL
IMPLND 11 IWATER SURO 1.7358 RCHRES 20 EXTNL IVOL
*** Total 15.1225 or 181.5 acres
```

```
*** SUB-BASIN 7 RUNOFF FROM LAND SEGMENTS
PERLND 25 PWATER PERO 9.3068 RCHRES 20 EXTNL IVOL
IMPLND 11 IWATER SURO 1.5590 RCHRES 20 EXTNL IVOL
*** Total 10.8658 or 130.4 acres
```

```
*** SUB-BASIN 10 RUNOFF FROM LAND SEGMENTS
PERLND 25 PWATER PERO 5.6329 RCHRES 20 EXTNL IVOL
PERLND 41 PWATER PERO 0.4627 RCHRES 20 EXTNL IVOL
IMPLND 11 IWATER SURO 0.9111 RCHRES 20 EXTNL IVOL
*** Total 7.0067 or 84.1 acres
```

```
*** SUB-BASIN 11 RUNOFF FROM LAND SEGMENTS
PERLND 15 PWATER PERO 1.1312 RCHRES 20 EXTNL IVOL
PERLND 25 PWATER PERO 0.5122 RCHRES 20 EXTNL IVOL
PERLND 31 PWATER PERO 0.1592 RCHRES 20 EXTNL IVOL
PERLND 41 PWATER PERO 0.0463 RCHRES 20 EXTNL IVOL
PERLND 51 PWATER PERO 0.0650 RCHRES 20 EXTNL IVOL
IMPLND 11 IWATER SURO 0.1545 RCHRES 20 EXTNL IVOL
*** Total 2.0684 or 24.8 acres
```

```
*** SUB-BASIN 23 RUNOFF FROM LAND SEGMENTS
PERLND 15 PWATER PERO 0.2658 RCHRES 22 EXTNL IVOL
PERLND 25 PWATER PERO 0.0415 RCHRES 22 EXTNL IVOL
PERLND 31 PWATER PERO 0.0717 RCHRES 22 EXTNL IVOL
PERLND 41 PWATER PERO 0.3800 RCHRES 22 EXTNL IVOL
IMPLND 11 IWATER SURO 0.8485 RCHRES 22 EXTNL IVOL
*** Total 1.6076 or 19.3 acres
```

```
*** SUB-BASIN 24 RUNOFF FROM LAND SEGMENTS
PERLND 25 PWATER PERO 1.1185 RCHRES 22 EXTNL IVOL
PERLND 41 PWATER PERO 0.7328 RCHRES 22 EXTNL IVOL
PERLND 51 PWATER PERO 0.2692 RCHRES 22 EXTNL IVOL
IMPLND 11 IWATER SURO 2.1412 RCHRES 22 EXTNL IVOL
*** Total 4.2617 or 51.1 acres
```

```

*** SUB-BASIN      25      RUNOFF FROM LAND SEGMENTS
PERLND  25 P WATER PERO          6.7221      RCHRES  21      EXTNL  IVOL
PERLND  41 P WATER PERO          0.0300      RCHRES  21      EXTNL  IVOL
IMPLND  11 I WATER SURO          3.0595      RCHRES  21      EXTNL  IVOL
***
***              Total  9.8116 or  117.7 acres
***
*** SUB-BASIN      26      RUNOFF FROM LAND SEGMENTS
PERLND  17 P WATER PERO          0.4544      RCHRES  20      EXTNL  IVOL
PERLND  15 P WATER PERO          0.5583      RCHRES  20      EXTNL  IVOL
PERLND  25 P WATER PERO          0.9455      RCHRES  20      EXTNL  IVOL
IMPLND  11 I WATER SURO          0.2943      RCHRES  20      EXTNL  IVOL
***
***              Total  2.2525 or   27.0 acres
***
*** SUB-BASIN      31      RUNOFF FROM LAND SEGMENTS
PERLND  25 P WATER PERO          5.2312      RCHRES  15      EXTNL  IVOL
IMPLND  11 I WATER SURO          1.3829      RCHRES  15      EXTNL  IVOL
***
***              Total  6.6141 or   79.4 acres
***
*** SUB-BASIN      32      RUNOFF FROM LAND SEGMENTS
PERLND  25 P WATER PERO          1.1365      RCHRES  16      EXTNL  IVOL
PERLND  41 P WATER PERO          0.1088      RCHRES  16      EXTNL  IVOL
PERLND  51 P WATER PERO          0.8150      RCHRES  16      EXTNL  IVOL
IMPLND  11 I WATER SURO          1.8505      RCHRES  16      EXTNL  IVOL
***
***              Total  3.9108 or   46.9 acres
***
*** SUB-BASIN      37      RUNOFF FROM LAND SEGMENTS
PERLND  25 P WATER PERO          1.5344      RCHRES   5      EXTNL  IVOL
IMPLND  11 I WATER SURO          1.9714      RCHRES   5      EXTNL  IVOL
***
***              Total  3.5058 or   42.1 acres
***
***              Grand total 67.0274 or  804.3 acres
***
***
*** CHANNEL NETWORK LINKAGES ***
RCHRES  20 HYDR  ROVOL  1          RCHRES  21      EXTNL  IVOL
RCHRES  21 HYDR  ROVOL  1          RCHRES  18      EXTNL  IVOL
RCHRES  18 HYDR  ROVOL  1          RCHRES  17      EXTNL  IVOL
RCHRES  17 HYDR  ROVOL  1          RCHRES  15      EXTNL  IVOL
RCHRES  22 HYDR  ROVOL  1          RCHRES  16      EXTNL  IVOL
RCHRES  16 HYDR  ROVOL  1          RCHRES  15      EXTNL  IVOL
RCHRES  15 HYDR  OVOL  1          RCHRES  10      EXTNL  IVOL
RCHRES  15 HYDR  OVOL  2          RCHRES   5      EXTNL  IVOL
***
***
*** GENERATE PLTGEN
***
*** DISPLAY
*** NOTE:  MFACTOR 48.4 CONVERTS ACRE-FEET OF RUNOFF TO AVERAGE CFS PER
***         15 MINUTE TIMESTEP.
***
-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name>   # <Name> # tem strg<-factor->strg <Name> # # <Name> # # ***
***Peak annuals for stage and flow
RCHRES  20 HYDR  STAGE  1          PLTGEN   1      INPUT  POINT  1
RCHRES  20 HYDR  STAGE  1          PLTGEN   1      INPUT  POINT  2
RCHRES  20 HYDR  RO    1          PLTGEN   1      INPUT  POINT  3
RCHRES   5 HYDR  RO    1          PLTGEN   1      INPUT  POINT  4
RCHRES  10 HYDR  RO    1          PLTGEN   1      INPUT  POINT  5
RCHRES  17 HYDR  RO    1          PLTGEN   1      INPUT  POINT  6
RCHRES  18 HYDR  RO    1          PLTGEN   1      INPUT  POINT  7
RCHRES  21 HYDR  RO    1          PLTGEN   1      INPUT  POINT  8
RCHRES  15 HYDR  STAGE  1          PLTGEN   1      INPUT  POINT  9
RCHRES  22 HYDR  RO    1          PLTGEN   1      INPUT  POINT 10
***

```

```

***
*** Seasonal duration analysis input
RCHRES 20 HYDR STAGE 1 DURANL 201 INPUT TIMSER 1
RCHRES 20 HYDR STAGE 1 DURANL 202 INPUT TIMSER 1
RCHRES 20 HYDR STAGE 1 DURANL 203 INPUT TIMSER 1
RCHRES 5 HYDR RO 1 DURANL 205 INPUT TIMSER 1
RCHRES 10 HYDR RO 1 DURANL 210 INPUT TIMSER 1
RCHRES 17 HYDR RO 1 DURANL 217 INPUT TIMSER 1
RCHRES 18 HYDR RO 1 DURANL 218 INPUT TIMSER 1
RCHRES 21 HYDR RO 1 DURANL 221 INPUT TIMSER 1
***
END NETWORK
***
***
EXT TARGETS
<-Volume-> <-Grp> <-Member-><---Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name> # <Name> # #<-factor-->strg <Name> # <Name> tem strg strg***
RCHRES 105 HYDR RO *** WDM 105 FLOW ENGL ADD
RCHRES 107 HYDR RO *** WDM 107 FLOW ENGL ADD
RCHRES 20 HYDR RO WDM 20 FLOW ENGL REPL
RCHRES 20 HYDR STAGE WDM 320 STAG ENGL REPL
RCHRES 21 HYDR RO WDM 21 FLOW ENGL REPL
RCHRES 22 HYDR RO *** WDM 22 FLOW ENGL ADD
RCHRES 22 HYDR STAGE *** WDM 322 STAG ENGL ADD
RCHRES 123 HYDR RO *** WDM 123 FLOW ENGL ADD
RCHRES 124 HYDR RO *** WDM 124 FLOW ENGL ADD
RCHRES 132 HYDR RO *** WDM 132 FLOW ENGL ADD
RCHRES 422 HYDR RO *** WDM 422 FLOW ENGL ADD
RCHRES 24 HYDR RO *** WDM 24 FLOW ENGL ADD
RCHRES 15 HYDR STAGE WDM 324 STAG ENGL REPL
RCHRES 15 HYDR O 1 WDM 251 FLOW ENGL REPL
RCHRES 15 HYDR O 2 WDM 252 FLOW ENGL REPL
RCHRES 137 HYDR RO *** WDM 137 FLOW ENGL ADD
RCHRES 5 HYDR RO WDM 127 FLOW ENGL REPL
RCHRES 10 HYDR RO WDM 424 FLOW ENGL REPL

END EXT TARGETS
***
RCHRES
GEN-INFO
RCHRES Name Nexits Unit Systems Printer ***
# - #<----->><----> User T-series Engl Metr LKFG ***
in out ***
20 BLACKMANS LAKE 1 1 1 1 6 0 1
21 S Ck 13TH to 10th 1 1 1 1 6 0 0
22 WETLAND MCDONALDS 1 1 1 1 6 0 0
18 S Ck 10th to 9th 1 1 1 1 6 0 0
17 S Ck 9th to campus 1 1 1 1 6 0 0
16 McDon wet to campus 1 1 1 1 6 0 0
15 Freshmans Campus 2 1 1 1 6 0 0
10 Split to Pilchuck 1 1 1 1 6 0 0
5 Split to Snohomish 1 1 1 1 6 0 0
END GEN-INFO
ACTIVITY
RCHRES ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
1 100 1 0 0 0 0 0 0 0 0 0 0
END ACTIVITY
PRINT-INFO
RCHRES ***** Printout Flags ***** PIVL PYR
# - # HYDR ADCA CONS HEAT SED GQL OXRX NUTR PLNK PHCB *****
1 100 6 0 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 possible exit | | | | *** ODGTFG for each possible exit | | | | FUNCT for each possible exit | | | | | |
| | | FG | FG | FG | FG | * | * | * | * | * | * | * | * | * | * | * | * | * | |
| 5 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 10 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 15 | | 0 | 1 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 16 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 17 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 18 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 20 | | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 21 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| 22 | | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |

END HYDR-PARM1

HYDR-PARM2

| RCHRES | | *** | | | | | | |
|--------|-----|--------|-------|-------|--------|-----|------|-----|
| # | - # | FTABNO | LEN | DELTH | STCOR | KS | DB50 | *** |
| 5 | | 5 | 0.663 | | | 0.3 | | *** |
| 10 | | 10 | 0.296 | | | 0.3 | | *** |
| 15 | | 15 | 0.360 | | 70.00 | 0.5 | | *** |
| 16 | | 16 | 0.148 | | | 0.3 | | *** |
| 17 | | 17 | 0.095 | | | 0.3 | | *** |
| 18 | | 18 | 0.123 | | | 0.3 | | *** |
| 20 | | 20 | 0.455 | | 135.85 | 0.5 | | *** |
| 21 | | 21 | 0.265 | | | 0.3 | | *** |
| 22 | | 22 | 0.133 | | 100.00 | 0.5 | | *** |

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 | | | |
| 5 | | 0.001 | 4.0 | | | | | |
| 10 | | 0.001 | 4.0 | | | | | |
| 15 | | 0.001 | 4.0 | 5.0 | | | | |
| 16 | | 0.001 | 4.0 | | | | | |
| 17 | | 0.001 | 4.0 | | | | | |
| 18 | | 0.001 | 4.0 | | | | | |
| 20 | | 261.6 | 4.0 | | | | | |
| 21 | | 0.001 | 4.0 | | | | | |
| 22 | | 0.100 | 4.0 | | | | | |

END HYDR-INIT

END RCHRES

FTABLES

FTABLE 5

*** This FTABLE represents the Snohomish River branch of the drainage system downstream from the splitter structure.
 *** Mixed open channel/pipe/culvert system.

ROWS COLS Splitter to Snohomish River

| Depth (ft) | Area (acres) | Volume (acre-ft) | Outflow1 (cfs) |
|------------|--------------|------------------|----------------|
| 0.0 | 0.241 | 0.00 | 0.0 |
| 0.21 | 0.275 | 0.146 | 1.0 |
| 0.27 | 0.284 | 0.178 | 1.5 |
| 0.34 | 0.295 | 0.217 | 2.2 |
| 0.39 | 0.304 | 0.246 | 2.8 |

| | | | |
|------|-------|-------|------|
| 0.43 | 0.310 | 0.268 | 3.3 |
| 0.47 | 0.317 | 0.292 | 3.9 |
| 0.75 | 0.362 | 0.441 | 8.5 |
| 0.82 | 0.373 | 0.482 | 10.0 |
| 1.04 | 0.408 | 0.604 | 15.0 |
| 1.22 | 0.473 | 0.713 | 20.0 |
| 1.53 | 0.486 | 0.931 | 30.0 |

END FTABLE 5

FTABLE 10

*** This FTABLE represents the Pilchuck River branch of the drainage
 *** system downstream from the splitter structure.
 *** 30-inch CMP system.

ROWS COLS Splitter to Pilchuck River

9 4

| Depth (ft) | Area (acres) | Volume (acre-ft) | Outflow1 (cfs) |
|---------------|-----------------|---------------------|-------------------|
|---------------|-----------------|---------------------|-------------------|

| | | | |
|------|-------|-------|------|
| 0.0 | 0.0 | 0.00 | 0.0 |
| 0.06 | 0.051 | 0.002 | 0.5 |
| 0.25 | 0.058 | 0.016 | 1.0 |
| 0.35 | 0.067 | 0.028 | 2.0 |
| 0.43 | 0.072 | 0.037 | 2.8 |
| 0.70 | 0.083 | 0.074 | 7.2 |
| 0.90 | 0.088 | 0.102 | 11.7 |
| 1.07 | 0.090 | 0.122 | 16.1 |
| 1.21 | 0.089 | 0.136 | 19.9 |

END FTABLE 10

FTABLE 15

*** This FTABLE represents the conveyance and storage within the
 *** Freshmans Campus area. This includes the recently constructed open
 *** channel (daylighting) of Swifty Creek.

*** Outflow1=Pilchuck River branch from the splitter structure

*** Outflow2=Snohomish River branch from the splitter structure

ROWS COLS Freshmans Campus area

11 5

| Depth (ft) | Area (acres) | Volume (acre-ft) | Outflow1 (cfs) | Outflow2 (cfs) |
|---------------|-----------------|---------------------|-------------------|-------------------|
|---------------|-----------------|---------------------|-------------------|-------------------|

| | | | | |
|------|-------|-------|------|------|
| 0.0 | 0.108 | 0.00 | 0.0 | 0.0 |
| 0.22 | 0.128 | 0.029 | 0.0 | 1.0 |
| 0.30 | 0.138 | 0.046 | 0.5 | 1.5 |
| 1.44 | 0.159 | 0.083 | 2.8 | 2.2 |
| 2.26 | 0.183 | 0.134 | 7.2 | 2.8 |
| 3.44 | 0.202 | 0.183 | 11.7 | 3.3 |
| 3.97 | 0.208 | 0.199 | 13.5 | 3.5 |
| 4.0 | 8.5 | 4.0 | 13.6 | 3.6 |
| 6.0 | 39.8 | 52.3 | 16.5 | 4.5 |
| 8.0 | 66.8 | 158.9 | 17.6 | 5.7 |
| 8.5 | 70.0 | 193.1 | 25.0 | 10.0 |

END FTABLE 15

FTABLE 16

*** This FTABLE represents the combined ditch/culvert system draining
 *** from McDonald's wetland.
 *** Ditch and 24-inch pipe system. Flows >30cfs means flooding.

```

***
ROWS COLS      System downstream from McDonalds wetland      ***
 14      4
  Depth      Area      Volume      Outflow1      ***
  (ft)      (acres) (acre-ft) (cfs)      ***
  0.0      0.0      0.00      0.0
  0.19     0.021     0.0018     0.5
  0.26     0.024     0.0036     1.0
  0.31     0.026     0.0054     1.5
  0.36     0.028     0.0072     2.0
  0.44     0.030     0.0090     3.0
  0.57     0.032     0.0125     5.0
  0.70     0.034     0.0179     7.5
  0.82     0.035     0.0215     10.0
  1.04     0.036     0.0287     15.0
  1.24     0.035     0.0376     20.0
  1.47     0.032     0.0448     25.0
  1.80     0.022     0.0537     30.0
  2.5      0.4      0.2      40.

```

END FTABLE 16

FTABLE 17

*** This FTABLE represents the open channel system from the entrance to
 *** Freshmans Campus upstream to the 9th St culvert.
 *** Developed from HEC-RAS modeling.

```

ROWS COLS      Open channel - 9th to Freshmans Campus      ***
 16      4
  Depth      Area      Volume      Outflow1      ***
  (ft)      (acres) (acre-ft) (cfs)      ***
  0.0      0.0      0.00      0.0
  0.21     0.07      0.004     0.5
  0.35     0.086     0.01      1.5
  0.50     0.094     0.018     3.0
  0.65     0.11      0.023     5.0
  0.78     0.12      0.03      7.0
  0.94     0.13      0.04      10.0
  1.17     0.15      0.05      15.0
  1.40     0.16      0.07      20.0
  1.61     0.177     0.08      25.0
  1.81     0.183     0.087     30.0
  2.00     0.19      0.093     35.0
  2.19     0.20      0.11      40.0
  2.38     0.21      0.12      45.0
  2.56     0.22      0.13      50.0
  2.98     0.23      0.15      60.0

```

END FTABLE 17

FTABLE 18

*** This FTABLE represents the open channel system between 9th and
 *** 10th Street.
 *** Developed from HEC-RAS modeling.

```

ROWS COLS      Open channel between 9th and 10th.      ***
 16      4
  Depth      Area      Volume      Outflow1      ***
  (ft)      (acres) (acre-ft) (cfs)      ***
  0.0      0.0      0.00      0.0
  0.25     0.02      0.008     0.5

```

| | | | |
|------|-------|-------|------|
| 0.38 | 0.03 | 0.014 | 1.5 |
| 0.51 | 0.05 | 0.02 | 3.0 |
| 0.66 | 0.06 | 0.03 | 5.0 |
| 0.78 | 0.067 | 0.067 | 7.0 |
| 0.95 | 0.074 | 0.073 | 10.0 |
| 1.19 | 0.09 | 0.09 | 15.0 |
| 1.42 | 0.10 | 0.10 | 20.0 |
| 1.62 | 0.11 | 0.11 | 25.0 |
| 1.80 | 0.13 | 0.13 | 30.0 |
| 1.98 | 0.14 | 0.18 | 35.0 |
| 2.15 | 0.23 | 0.25 | 40.0 |
| 2.31 | 0.25 | 0.37 | 45.0 |
| 2.48 | 0.29 | 0.56 | 50.0 |
| 2.78 | 0.31 | 0.62 | 60.0 |

END FTABLE 18

FTABLE 20

*** This ftable depicts regraded outlet channel, clean culverts, weir outlet structure
 *** with seasonal settings as follows:

*** winter weir elev = 140.7' set in November

*** summer weir elev = 140.7' set in April (i.e., no seasonal adjustme

ROWS COLS BLACKMAN'S LAKE (lake and outlet to 13th (Smithson Pl)) **

15 4

| Depth | Area | Volume | Winter | Summer | |
|-------|---------|-----------|----------|----------|-----|
| (ft) | (acres) | (acre-ft) | Outflow1 | Outflow2 | |
| | | | (cfs) | (cfs) | *** |
| 0.0 | 50.1 | 0.00 | 0.0 | 0.0 | |
| 4.85 | 60.3 | 276.5 | 0.0 | 0.0 | |
| 4.93 | 60.5 | 281.0 | 0.5 | 0.5 | |
| 5.02 | 60.7 | 286.1 | 1.5 | 1.5 | |
| 5.15 | 61.0 | 293.6 | 3.0 | 3.0 | |
| 5.30 | 61.3 | 302.1 | 5.0 | 5.0 | |
| 5.46 | 61.6 | 311.2 | 7.0 | 7.0 | |
| 5.68 | 62.1 | 323.8 | 10.0 | 10.0 | |
| 6.05 | 62.8 | 344.9 | 15.0 | 15.0 | |
| 6.40 | 63.6 | 364.8 | 20.0 | 20.0 | |
| 6.75 | 66.3 | 388.0 | 25.0 | 25.0 | |
| 7.11 | 70.6 | 414.5 | 30.0 | 30.0 | |
| 7.31 | 73.0 | 429.2 | 35.0 | 35.0 | |
| 7.47 | 74.9 | 440.9 | 40.0 | 40.0 | |
| 8.15 | 83.0 | 490.9 | 45.0 | 45.0 | |

END FTABLE 20

FTABLE 21

*** This FTABLE depicts the open channel reach between 10th St and
 *** Smithson St.

*** Developed from a HEC-RAS model.

ROWS COLS ***

16 4

| Depth | Area | Volume | Outflow1 | |
|-------|---------|-----------|----------|-----|
| (ft) | (acres) | (acre-ft) | (cfs) | |
| 0.0 | 0.000 | 0.00 | 0.00 | *** |
| 0.15 | 0.12 | 0.02 | 0.50 | *** |
| 0.23 | 0.16 | 0.05 | 1.50 | *** |
| 0.73 | 0.21 | 0.07 | 3.00 | |
| 0.88 | 0.25 | 0.10 | 5.00 | |
| 0.99 | 0.28 | 0.13 | 7.00 | |

```

1.13    0.33    0.17    10.00
1.32    0.37    0.23    15.00
1.50    0.42    0.29    20.00
1.57    0.45    0.33    25.00
1.69    0.48    0.39    30.00
1.78    0.51    0.45    35.00
1.87    0.53    0.53    40.00
1.96    0.57    0.63    45.00
2.04    0.60    0.76    50.00
2.19    0.71    1.18    60.00
END FTABLE 21
***
***
FTABLE    22
***
*** Wetland McDonalds
*** Unmodified from Beck study.
***
ROWS COLS                                ***
  9     4
  Depth      Area      Volume  Outflow1
  (ft)      (acres)  (acre-ft)  (cfs)
  0.0       0.000     0.00      0.00
  0.71      0.001     0.10      2.00
  1.37      0.001     0.20      6.00
  2.20      0.001     0.50     10.00
  3.30      0.001     0.90     14.00
  4.63      1.470     7.14     18.00
  5.39      1.810     8.66     20.00
  9.71      3.0       20.5     28.00
 10.52      3.1       21.0     60.00
END FTABLE 22
***
END FTABLES
***
PLTGEN
PLOTINFO
# - # FILE  NPT  NMN LABEL  PYR PIVL  ***
1   30  10   0   0    9   -2
END PLOTINFO

GEN-LABELS
# - # <-----TITLE-----> *** <-----YLABL----->
1   EXISTING LAND USE: Blackman Lk study
*** 2   4 EXISTING LAND USE: Peak flow
                                     STAGE (FT) or Flow
                                     FLOW (CFS)

END GEN-LABELS

SCALING
<-RANGE><--YMIN--><--YMAX--><--IVLIN--><-THRESH--> ***
#   #
1   #   0.   300.  10.
*** 2   4   0.   500.  20.
END SCALING
CURV-DATA
<-RANGE> <-----LABEL-----><LIN><INT><COL> <TR> ***
#   #
1   Lake Stage min MIN
END CURV-DATA
CURV-DATA
<-RANGE> <-----LABEL-----><LIN><INT><COL> <TR> ***
#   #
1   Lake Stage peak MAX

```

```

END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 20 peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 5  peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 10 peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 17 peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 18 peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 21 peak Q                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCH 15 max stage                       MAX
END CURV-DATA
CURV-DATA
<-RANGE>      <-----LABEL-----><LIN><INT><COL> <TR>  ***
#             #                                     ***
1             RCHRES 22 peak Q                       MAX
END CURV-DATA
***
END PLTGEN
***
DURANL
***  FORTRAN unit number 40 is used for FLOW duration analysis output
***  and contains output for all RCHRES segments
GEN-DURDATA
#thru#<***-----title-----> NDUR NLEV PRFG  P- LCNU LCOU
***                                     UNIT
201  RCHRES 20 stage duration for summer          1  20  1  40  0  0
202  RCHRES 20 stage duration for winter          1  20  1  40  0  0
203  RCHRES 20 stage duration for annual           1  20  1  40  0  0
205  RCHRES 5  flow duration for annual            1  20  1  40  0  0
210  RCHRES 10 flow duration for annual            1  20  1  40  0  0
217  RCHRES 17 flow duration for annual            1  20  1  40  0  0
218  RCHRES 18 flow duration for annual            1  20  1  40  0  0
221  RCHRES 21 flow duration for annual            1  20  1  40  0  0
***
END GEN-DURDATA
***
***  The following DURATIONS block represents the number of increments of the
***  run time-step to aggregate for the duration analysis.

```

```

DURATIONS
  #thru#***<---Durations----- (10 max)----->
    *** 1   2   3   4   5   6   7   8   9  10
201  203   1
205  221   1
END DURATIONS
***
*** Levels specified are discharge values chosen to characterize the range of
*** flows expected for the listed rchres segments. Up to 20 levels allowed.
*** See page 647 for format. Note that the manual example format is incorrect.
LEVELS
  #thru#*** 1   2   3   4   5   6   7   8   9  10  11  12  13  14
  #thru#***15  16  17  18  19  20
201  203136.0137.0138.0139.0139.5139.7140.0140.2140.4140.6140.8141.0141.2141.4
201  203141.6141.8142.0142.2142.5143.0
***
205  221  0.1  0.2  0.5  1.0  2.0  3.0  4.0  5.0  6.0  8.0 10.0 12.0 15. 18.
205  221  20.  25.  30.  35.  40.  50.
END LEVELS
SEASON
  ***
  #thru#***
201          Start          End
          mo da hr mn      mo da hr mn
201          06 1  0  0      09 30 24  0
202          11 1  0  0      03
203  221     01 1  0  0      12
***
END SEASON
END DURANL
***
END RUN

```