Anlage 5.4

Gemeinde Oberried

Klosterplatz 4, 79254 Oberried

Erschließung Baugebiet
Vörlinsbach – Steiertenhof

Projekt-Nr. 5-254-004

Hydraulische Berechnung der Regenwasserleitungen

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)

BG Steiertenhof Planung 13.11.2025
WARNING 01: wet weather time step reduced to recording interval for Rain Gage Oberried

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***************
Analysis Options
***************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... SLOT
Starting Date ..... 10/19/2025 00:00:00
Ending Date ..... 10/19/2025 05:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:05:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.062	17.400
Evaporation Loss	0.000	0.000
Infiltration Loss	0.006	1.668
Surface Runoff	0.040	11.153
Final Storage	0.019	5.284
Continuity Error (%)	-4.052	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.040	0.395
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.040	0.396
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000

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  Final Stored Volume ......          0.000         0.000
  Continuity Error (%) .....         -0.205


  ***************************
  Time-Step Critical Elements
  ***************************
  None


  *********************************
  Highest Flow Instability Indexes
  *********************************
  All links are stable.


  *********************************
  Most Frequent Nonconverging Nodes
  *********************************
  Node Auslauf (0.02%)
  Node RW04 (0.02%)
  Node RW-Abl.3 (0.01%)


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.22
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.02
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    99.86 %
      0.871 -  0.758 sec      :     0.05 %
      0.758 -  0.660 sec      :     0.02 %
      0.660 -  0.574 sec      :     0.02 %
      0.574 -  0.500 sec      :     0.05 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------
----------------------------------------------------
                             Total      Total      Total      Total
Imperv       Perv      Total       Total     Peak  Runoff
                          Precip      Runon      Evap      Infil
Runoff     Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                mm         mm         mm         mm
mm         mm          mm    10^6 ltr      LPS
  ------------------------------------------------------------------------
----------------------------------------------------
  BA1                       17.40       0.00       0.00       1.56
8.56      11.51      11.51        0.05    69.01   0.661
  BA2                       17.40       0.00       0.00       1.72
7.57      11.04      11.04        0.13   154.68   0.635
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  BA3                        17.40       0.00       0.00       1.72
7.63      11.14      11.14        0.14   186.92   0.640
  BA1_1                      17.40       0.00       0.00       1.56
8.57      11.02      11.02        0.04    61.96   0.633
  BA1_2                      17.40       0.00       0.00       1.56
8.60      11.34      11.34        0.03    51.08   0.652


  ***********************
  LID Performance Summary
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  ------------------------------------------------------------------------
-----------------------------------------------
                                          Total      Evap     Infil
Surface    Drain    Initial     Final  Continuity
                                         Inflow      Loss      Loss
Outflow   Outflow   Storage   Storage       Error
  Subcatchment      LID Control             mm        mm        mm
mm        mm        mm        mm            %
  ------------------------------------------------------------------------
-----------------------------------------------
  BA1               Zisterne           4471.31      0.00      0.00
2471.31      0.00      0.00   2000.00        0.00
  BA2               Zisterne           4131.00      0.00      0.00
2131.00      0.00      0.00   2000.00       -0.00
  BA3               Zisterne           4037.20      0.00      0.00
2037.20      0.00      0.00   2000.00        0.00
  BA1_1             Zisterne           3911.87      0.00      0.00
1911.87      0.00      0.00   2000.00        0.00
  BA1_2             Zisterne           4156.71      0.00      0.00
2156.71      0.00      0.00   2000.00       -0.00

  ******************
  Node Depth Summary
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  ------------------------------------------------------------------------
----------
                                  Average  Maximum  Maximum  Time of Max
Reported
                                    Depth    Depth      HGL   Occurrence
Max Depth
  Node                 Type       Meters   Meters   Meters  days hr:min
Meters
  ------------------------------------------------------------------------
----------
  RW-Abl.5             JUNCTION     0.04     0.54   446.69     0  00:19
0.53
  RW-Abl.6             JUNCTION     0.05     1.27   448.24     0  00:16
1.23
  RW-Abl.8             JUNCTION     0.06     0.86   450.71     0  00:16
0.86
  RW04                 JUNCTION     0.05     1.44   452.32     0  00:16
1.42
  RW-Abl.2             JUNCTION     0.09     1.48   444.13     0  00:19
1.47
  RW-Abl.3             JUNCTION     0.07     1.70   444.91     0  00:19
1.68
```

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  RW-Abl.7             JUNCTION     0.03     0.29   449.85     0  00:15
0.29
  RW-Abl.4             JUNCTION     0.03     0.75   445.83     0  00:19
0.74
  RW-Abl.9             JUNCTION     0.05     1.07   451.19     0  00:16
1.06
  RW15                 JUNCTION     0.02     0.18   483.42     0  00:15
0.18
  RW-Abl.1             JUNCTION     0.08     0.96   443.57     0  00:19
0.95
  RW09                 JUNCTION     0.01     0.10   463.83     0  00:14
0.10
  RW14                 JUNCTION     0.01     0.09   474.05     0  00:15
0.09
  Auslauf              OUTFALL      0.05     0.43   442.99     0  00:19
0.43


  ********************
  Node Inflow Summary
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                                  Maximum  Maximum
Lateral       Total        Flow
                                  Lateral    Total  Time of Max
Inflow      Inflow     Balance
                                   Inflow   Inflow   Occurrence
Volume      Volume       Error
  Node                 Type           LPS      LPS  days hr:min    10^6
ltr    10^6 ltr     Percent
  ------------------------------------------------------------------------
--------------------------
  RW-Abl.5             JUNCTION      0.00   444.76     0  00:16
0       0.398       0.117
  RW-Abl.6             JUNCTION      0.00   441.64     0  00:16
0       0.398      -0.059
  RW-Abl.8             JUNCTION      0.00   441.66     0  00:16
0       0.398      -0.004
  RW04                 JUNCTION     61.96   516.87     0  00:15
0.0402       0.395       -0.775
  RW-Abl.2             JUNCTION      0.00   403.99     0  00:19
0       0.396      -0.009
  RW-Abl.3             JUNCTION      0.00   408.82     0  00:18
0       0.396      -0.076
  RW-Abl.7             JUNCTION      0.00   441.67     0  00:16
0       0.398       0.071
  RW-Abl.4             JUNCTION      0.00   448.76     0  00:18
0       0.398       0.504
  RW-Abl.9             JUNCTION      0.00   441.71     0  00:16
0       0.398      -0.011
  RW15                 JUNCTION    341.60   341.60     0  00:15
0.274       0.274       0.258
  RW-Abl.1             JUNCTION      0.00   403.79     0  00:19
0       0.396      -0.004
  RW09                 JUNCTION     51.08   117.14     0  00:15
0.0329      0.0812       0.344
  RW14                 JUNCTION     69.01    69.01     0  00:15
0.0481      0.0482      -0.164
```

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  Auslauf              OUTFALL       0.00   403.89     0  00:19
0       0.396       0.000


  **********************
  Node Surcharge Summary
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  Surcharging occurs when water rises above the top of the highest
conduit.
  ------------------------------------------------------------------------
                                                 Max. Height   Min. Depth
                                   Hours       Above Crown    Below Rim
  Node                  Type      Surcharged         Meters       Meters
  ------------------------------------------------------------------------
  RW-Abl.5              JUNCTION        0.01          0.038        2.212
  RW-Abl.6              JUNCTION        0.10          0.775        1.025
  RW-Abl.8              JUNCTION        0.12          0.360        0.670
  RW-Abl.2              JUNCTION        0.21          0.984        0.000
  RW-Abl.3              JUNCTION        0.13          1.196        0.554
  RW-Abl.4              JUNCTION        0.05          0.251        1.989
  RW-Abl.9              JUNCTION        0.11          0.569        0.751
  RW-Abl.1              JUNCTION        0.18          0.463        0.487


  **********************
  Node Flooding Summary
  **********************

  No nodes were flooded.


  ************************
  Outfall Loading Summary
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  -----------------------------------------------------------
                        Flow       Avg       Max       Total
                        Freq      Flow      Flow      Volume
  Outfall Node           Pcnt       LPS       LPS    10^6 ltr
  -----------------------------------------------------------
  Auslauf               59.09     37.43    403.89       0.396
  -----------------------------------------------------------
  System                59.09     37.43    403.89       0.396


  ********************
  Link Flow Summary
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  ------------------------------------------------------------------------
------
                                Maximum  Time of Max   Maximum    Max/
Max/
                                 |Flow|   Occurrence   |Veloc|    Full
Full
  Link                  Type         LPS  days hr:min     m/sec    Flow
Depth
  ------------------------------------------------------------------------
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RW-Abl.1	CONDUIT	403.89	0	00:19	2.06	2.25	1.00
RW-Abl.2	CONDUIT	403.79	0	00:19	2.06	2.54	1.00
RW-Abl.3	CONDUIT	403.99	0	00:19	2.06	0.94	1.00
RW-Abl.4	CONDUIT	408.82	0	00:18	2.60	0.59	1.00
RW-Abl.8	CONDUIT	441.67	0	00:16	2.25	1.13	1.00
RW-Abl.5	CONDUIT	448.76	0	00:18	2.79	0.82	1.00
RW-Abl.6	CONDUIT	444.76	0	00:16	2.27	1.23	1.00
RW-Abl.7	CONDUIT	441.64	0	00:16	2.55	0.63	1.00
RW04	CONDUIT	441.71	0	00:16	2.25	0.43	1.00
RW15	CONDUIT	337.32	0	00:15	2.86	0.43	1.00
RW-Abl.9	CONDUIT	441.66	0	00:16	2.25	0.62	1.00
RW09	CONDUIT	123.60	0	00:14	3.82	0.09	0.54
RW14	CONDUIT	67.18	0	00:15	3.45	0.09	0.21

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Flow Classification Summary
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	Adjusted	---------- Fraction of Time in Flow Class ----------							
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd Ctrl
RW-Abl.1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00 0.00
RW-Abl.2	1.00	0.03	0.24	0.00	0.73	0.00	0.00	0.00	0.61 0.00
RW-Abl.3	1.00	0.27	0.10	0.00	0.62	0.01	0.00	0.00	0.91 0.00
RW-Abl.4	1.00	0.02	0.00	0.00	0.46	0.52	0.00	0.00	0.88 0.00
RW-Abl.8	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00 0.00
RW-Abl.5	1.00	0.02	0.00	0.00	0.43	0.55	0.00	0.00	0.43 0.00
RW-Abl.6	1.00	0.02	0.00	0.00	0.50	0.48	0.00	0.00	0.44 0.00
RW-Abl.7	1.00	0.02	0.39	0.00	0.12	0.47	0.00	0.00	0.95 0.00
RW04	1.00	0.02	0.00	0.00	0.48	0.51	0.00	0.00	0.59 0.00

RW15	1.00	0.02	0.00	0.00	0.46	0.52	0.00	0.00
0.98	0.00							
RW-Abl.9	1.00	0.02	0.42	0.00	0.12	0.44	0.00	0.00
0.72	0.00							
RW09	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97
0.01	0.00							
RW14	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98
0.00	0.00							

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
RW-Abl.1	0.01	0.18	0.01	0.20	0.11
RW-Abl.2	0.18	0.21	0.18	0.24	0.19
RW-Abl.3	0.13	0.13	0.21	0.01	0.10
RW-Abl.4	0.05	0.05	0.13	0.01	0.01
RW-Abl.8	0.01	0.12	0.01	0.07	0.09
RW-Abl.5	0.01	0.01	0.05	0.01	0.01
RW-Abl.6	0.01	0.10	0.01	0.07	0.07
RW-Abl.7	0.01	0.01	0.10	0.01	0.01
RW04	0.09	0.09	0.11	0.01	0.07
RW15	0.01	0.01	0.11	0.01	0.01
RW-Abl.9	0.11	0.11	0.12	0.01	0.09

Analysis begun on: Sun Nov 16 15:21:26 2025
Analysis ended on: Sun Nov 16 15:21:26 2025
Total elapsed time: < 1 sec