APPENDIX 8.4

ASSESSMENT OF POLLUTION IMPACTS FROM ROUTINE RUN-OFF TO GROUNDWATER

Method C – Assessment of Pollution Impacts from Routine Runoff on Groundwaters

Calculation methodology: Road Drainage and the Water Environment HA 216/06. Volume11 Section 3 Part 10

Summary of risks

Proposed drainage feature	Overall Risk Score	Risk of Impact
Detention Basin Network A	215.0	MEDIUM
Detention Basin Network B	222.5	MEDIUM
Filter Trench Network C	192.5	MEDIUM

Job No: P346600
Job Name: A82 Crianlarich

Assessment of Pollution Impacts from routine runoff to groundwaters *Road Drainage and the water environment HA 216/06. Volume11 Section 3 Part 10*
DETENTION BASIN NETWORK A
Calc By: Z. Reville / H . Carlyle **Calc Date: 22/05/2008**

Data

1. Traffic Density	**4100**	*A82 Crianlarich Bypass Traffic Flow Information - Dec 08*
2. Rainfall Volume	**2471**	*Flood Estimation Handbook Volume 2 (River Fillan catchment at Crianlarich)*
3. Rainfall Intensity	**35 - 39 mm**	*Flood Estimation Handbook Volume 2 Figure 11.6*
4. Depth to Water	**1.58 to 3.43 mbGL**	*Groundwater monitoring from May 08 to March 09 (manual dips from BH203 (2008 GI))*
5. Flow Type	**Intergranular flow**	*PSSR Report Western (Final02) Appendix 5.2: Whatlings 1986 GI, Norwest Holst GI May 2008 (BH203, TPs311, 312)*
6. Effective Grain Size	**Peat with sand partings (0 - 2m bGL) overlying clayey sandy gravel**	*PSSR Report Western (Final02) Appendix 5.1: Wimpey 1985 GI (BH1) and Whatlings 1986 GI (TP109, BH115, BH116, BH117), Norwest Holst GI May 2008 (TPs311, 312)*
7. Lithology	**10% - 22% clay minerals**	*Norwest Holst GI May 2008 (TPs 311, 312 - clayey sandy gravel)*

Property	Weighting Factor	Site Data (AADT)	Risk Score	Component Score
Traffic Density	15	4100	1	15
Rainfall Volume	15	2471	3	45
Rainfall Intensity		35 -39 mm		
Soakaway Geometry	15	Single pont (road area <5000m^2)	2	30
Unsaturated zone (depth to water)	20	1.58 to 3.43m	3	60
Flow Type	20	Intergranular flow	1	20
Effective Grain Size	7.5	Clayey sandy gravel	3	22.5
Lithology	7.5	10% - 22% clay minerals	3	22.5
OVERALL RISK SCORE				215

Overall Risk Score	<150	Low Risk of Impact
	150-250	Medium Risk of Impact
	>250	High Risk of Impact

HA 216/06. Volume11 Section 3 Part 10
Annex I page AI/9

Job No: P346600
Job Name: A82 Crianlarich

Assessment of Pollution Impacts from routine runoff to groundwaters *Road Drainage and the water environment HA 216/06. Volume11 Section 3 Part 10*
DETENTION BASIN NETWORK B
Calc By: **Z. Reville / H . Carlyle** **Calc Date: 22/05/2008**

Data

1. Traffic Density	**3200**	*A82 Crianlarich Bypass Traffic Flow Information - Dec 08*
2. Rainfall Volume	**2471**	*Flood Estimation Handbook Volume 2 (River Fillan catchment at Crianlarich)*
3. Rainfall Intensity	**35 - 39 mm**	*Flood Estimation Handbook Volume 2 Figure 11.6*
4. Depth to Water	**0.85 to 4.46 mbGL**	*Groundwater monitoring from May 08 to March 09 (manual dips from BH210 (2008 GI))*
5. Flow Type	**Intergranular flow**	*PSSR Report Western (Final02) Appendix 5.2: Whatlings 1986 GI, Norwest Holst GI May 2008 (BH210, TPs 311, 312)*
6. Effective Grain Size	**Silty gravelly sand**	*PSSR Report Western (Final02) Appendix 5.2: Whatlings 1986 GI (BH125),Norwest Holst GI May 2008 (BH210, TPs 327, 328)*
7. Lithology	**8% - 13% clay minerals**	*Norwest Holst GI May 2008 (BH210, TPs 327, 328)*

Property	Weighting Factor	Site Data (AADT)	Risk Score	Component Score
Traffic Density	15	3200	1	15
Rainfall Volume	15	2471	3	45
Rainfall Intensity		35 -39 mm		
Soakaway Geometry	15	Single point (road area >5000m^2)	3	45
Unsaturated zone (depth to water)	20	0.85 to 4.46m	3	60
Flow Type	20	Intergranular flow	1	20
Effective Grain Size	7.5	Silty gravelly sand	3	22.5
Lithology	7.5	8% - 13% clay minerals	2	15
OVERALL RISK SCORE				222.5

Overall Risk Score	<150	Low Risk of Impact
	150-250	Medium Risk of Impact
	>250	High Risk of Impact

HA 216/06. Volume11 Section 3 Part 10
Annex I page AI/9

Job No: P346600
Job Name: A82 Crianlarich

Assessment of Pollution Impacts from routine runoff to groundwaters *Road Drainage and the water environment HA 216/06. Volume11 Section 3 Part 10*
Filter Trench - NETWORK C
Calc By: Z. Reville / H . Carlyle **Calc Date: 28/07/2009**

Data

1. Traffic Density	**6700**	*A82 Crianlarich Bypass Traffic Flow Information - Dec 08*
2. Rainfall Volume	**2471**	*Flood Estimation Handbook Volume 2 (River Fillan catchment at Crianlarich)*
3. Rainfall Intensity	**35 - 39 mm**	*Flood Estimation Handbook Volume 2 Figure 11.6*
4. Depth to Water	**0.85 to 4.46 mbGL**	*Groundwater monitoring from May 08 to March 09 (manual dips from BH210 (2008 GI))*
5. Flow Type	**Intergranular flow**	*PSSR Report Western (Final02) Appendix 5.2: Whatlings 1986 GI, Norwest Holst GI May 2008 (BH210, TPs332-335 inclusive)*
6. Effective Grain Size	**Clayey sandy gravel**	*PSSR Report Western (Final02) Appendix 5.2: Whatlings 1986 GI (BH125), Norwest Holst GI May 2008 (BH210, TPs332-335 incl.)*
7. Lithology	**8% - 37% clay minerals**	*Norwest Holst GI May 2008 (BH210, TPs332-335 inclusive)*

Property	Weighting Factor	Site Data (AADT)	Risk Score	Component Score
Traffic Density	15	6700	1	15
Rainfall Volume	15	2471	3	45
Rainfall Intensity		35 -39 mm		
Soakaway Geometry	15	Continous linear (road area <5000m2)	1	15
Unsaturated zone (depth to water)	20	0.85 to 4.46m	3	60
Flow Type	20	Intergranular flow	1	20
Effective Grain Size	7.5	Clayey sandy gravel	3	22.5
Lithology	7.5	8% - 37% clay minerals	2	15
OVERALL RISK SCORE				192.5

Overall Risk Score	<150	Low Risk of Impact
	150-250	Medium Risk of Impact
	>250	High Risk of Impact

HA 216/06. Volume11 Section 3 Part 10
Annex I page AI/9