

## Haddo – Turning Area and Capping Road Spec

### Formation of Turning Area – Specification

1. All methods of construction will be in accordance with the current safety regulations and will follow safety and health regulations.
2. The formation will be a firm foundation on which to establish the road base. It may be necessary to strengthen the formation by mechanical stabilisation to achieve a reasonable bearing capacity. The formation will be shaped to shed water and prevent water damage.
3. Where found, fill will be of the best quality available from locally won materials and will be placed in layers which can be effectively compacted.
4. Allowance will be made for settlement in deciding on the final level of formation, and for the fill material assuming its angle of repose.
5. The slope of any embankment batter will be at the natural angle of repose of the fill material.
6. The objective of the road drainage system is to ensure that the ground water table is at all times lower than the road pavement base course and that the surface water can easily and effectively run off the pavement surfaces.
7. Cut-off drains beyond the upper batter may be necessary.
8. Roadside ditches will have a depth not less than 150mm below the underside of the road base and, where possible, will have a longitudinal fall of not less than 2%. Road-side drainage will not be directed into recognised water courses without a suitable riparian buffer zone and be terminated in an adequate sump to trap silt run-off.

### PAVEMENT DESIGN AND CONSTRUCTION

1. The structural design of the pavement will be a function of the quality of the sub-grade, the materials used in the pavement and of loading intensity.
2. The road pavement will be built to withstand full highway loading, 44tons.
3. Pavement material will be placed and then compacted with a suitable roller. Rolling will begin at the outer edges and gradually move toward the centre until the entire course is thoroughly compacted.
4. Slopes of cuttings will be left free of standing water at all times. Road formations will be shaped to the required camber or crossfall, be compacted and left free of any unsuitable material prior to placing of capping material.
5. All culverts will be laid in the natural ground if possible rather than in fill to prevent differential settlement and vertical displacement between adjacent pipes. Where access is reasonably good, culverts will be laid in the solid before the earthworks are carried out and this will be done where drains are to be cut in advance. Where culverts are installed after completion of earthworks on

moderate cross slopes the excavation for them should be taken down through the fill to the solid as the additional stability of the culvert and prevention of scour at the outfall.

6. Where the laying of culverts infill cannot be avoided, installation will be delayed for a time in order that the rate of settlement decreases very rapidly after the fill is placed.

7. Culvert pipes will be constructed from twin wall HDPE pipes which are constructed to BBA Approved Standard. It is also certified for use by the Highway Authorities Product Approval Scheme (HAPAS) the National Roads and Bridges Authority. Twin wall plastic drainage pipes are manufactured in accordance with the maker's own specification

8. Installation of twin wall plastic pipes will be in accordance with the maker's installation manual.

9. Culverts will be placed sufficiently deep to give clearance of forest drains discharging into them, allowing for subsequent deepening of the drain where this may be required.

#### ROAD DRAINAGE

1. Forest road work will be executed to avoid damage to stream systems and in accordance with current Forest and Water Guidelines. Riparian vegetation will be protected, and sediment and debris prevented from reaching streams.

2. The following measures will help to achieve this:

a. Culverts will be protected and well bedded to avoid settlement.

b. Both inflow and outflow ends of culverts will be protected against erosion by reinforcing the substrate and reducing flow velocities.

c. Erosion of roadside banks will be controlled by means of intercepting trenches or terracing. Embankments and cuttings will be at no more than the natural angle of repose to encourage revegetation and through retention of vegetation stripped from construction to be reused on exposed soil artificially to assist natural re-establishment. These measures will be especially important in the vicinity of culverts. Similar considerations apply to borrow pits.

#### ROAD DESIGN STANDARD

1. The method of construction will be in accordance with current safety regulations and in line with current forestry guidelines.

2. Prior to commencement of any earthworks, pipes, cable positions for water sewage, electricity and telephone services will be located and clearly marked on the ground. These will be protected as required.

3. Hazards such as overhead powerlines will be marked using "goal posts" which will allow minimum clearance and be marked with red and white marker tape in accordance with current guidance.

4. The formation will be a firm formation on which the road pavement will be constructed. The formation will be constructed using materials and design which achieves the necessary bearing capacity.

5. The formation will be shaped so as to shed water and prevent water damage.

6. The minimum camber from the centre line of the roadway to its outer edge will be 75mm and will be increased proportionally for wider formations.

7. The gradient on bends with radius less than 30m shall not exceed 5%

8. The effective road pavement on straights and curves of greater than 90m radius will be 3.4m In this case the "effective width" denotes full depth metalling and feathered edges are not included in carriage way width.

9. For radii less than 90m to centre line the width of pavement will be increased as follows: Radius (m) Total width for deflections 15 - 19 Total width for deflections 90-180 90 3.8m 3.8m 60 4.0m 4.0m 45 4.0m 4.5m

10. The road drainage system will ensure that the ground water table is at all times lower than the road pavement base course and that the surface water can easily and effectively run off the pavement surfaces.

11. Roadside drains will have a depth not less than 150mm below the underside of the road base and where possible will have a longitudinal fall of less than 2%. Roadside drains will not be directed into recognised water courses without a suitable riparian buffer zone.

12. It is proposed to use locally won material from borrow pits created within the forest to provide both formation and pavement materials. This material will be graded on site as required.

13. Material can be laid in one layer if the grading is acceptable or in two layers with coarser free draining material in the lower layer and topping wearing course of finer material containing a certain amount of clay friction to bind and seal the surface.

14. Pavement material will be placed and then compacted with a suitable roller. Rolling will begin at the outer edges and gradually move toward the centre until the entire course is thoroughly compacted.

15. Pavement material will be laid in a way to prevent damage to road formation either by passage of heavily laden vehicles or rutting of uncompacted metal by same vehicles. The finished surface will be smooth sealed and shaped to required camber.

16. Earthworks and formations will be left free of standing water at all times. Road formations will be shaped to required camber or crossfall, be compacted and left free of any suitable material prior to placing road stone.

17. Warning signs will be placed at entrance to site and along route