

Tree in hard surface: Stockholm structural soil

A Stockholm structural soil consists of packed stone shards with soil or biochar flushed down into the cavities. Read the entire description carefully before work. Standard detail drawing and a template for the control plan are available as appendices.

SEE ALSO:
APPENDIX **Control plan**
Standard detail drawing **THVB020**

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.



STEP 1. Documentation and control

Submit soil analysis with particle size distribution curve and nutrient analysis of all soils used in the planting bed to the client. Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Stockholm structural soil **AMA** DCL.131

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** BJB.29

AMA YCE.112

Control plan **AMA** YCQ.1112



STEP 2. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require drainage, compacted subgrades may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Geomembranes are placed on the excavation wall facing the property to prevent water from the planting bed from penetrating the foundation.

Geotextile **AMA** DBB.3133

Class N3

Geomembrane **AMA** DBB.3133

LDPE geomembrane. Thickness 0.5 mm. Made in one layer, joints are overlapped by 0.5 m.

Stockholm structural soil **AMA** DCL.131

Loosening of subgrade depth 200 mm



STEP 3. Construction of Stockholm structural soil

Start by adding a 50 mm thick layer of unfertilised biochar on the subgrade.

Then lay down a 250-300 mm thick layer of 90/150 mm stone shards. The size of the stones should be as even as possible to provide space for the roots to grow. Compact with a vibratory plate compactor with at least four passes of 400 kg.

Place a maximum of 20 mm of plant substrate type B on top of the compacted stones. Flush the soil down between the stones with a narrow jet and high pressure. Add a new layer of soil (max 20 mm) and flush it into the cavities. Repeat until the layer of stone shards is saturated, i.e., when the upper surface of the stones emerges from a soil saturated layer.



Repeat the layering of stone shards and flushing of soil until the prescribed depth of the Stockholm structural soil is reached.

Stockholm structural soil **AMA** DCL.131

Unfertilized biochar layer thickness 50 mm

Macadam 90/150 mm layer thickness ~600 mm

Plant substrate type B* 0,25 m³/1 m³ macadam
or

Nutrient-enriched biochar**

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

* For the soil to be easily flushed down, the organic matter content should be less than 2% by weight and the clay content 4–8% by weight.

** 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.



STEP 4. Installation of tree pit foundation

Install the tree pit foundation so that the aeration layer (see STEP 6) falls in through the openings in the side. The closed upper part of the foundation must be adapted to the thickness of the base course to prevent it from falling into the tree pit and mixing with the plant substrate. This creates stability and prevents soil subsidence around the tree pit in the future. Level adjustment must be carried out with macadam 8/11 mm.

Tree pit foundation **AMA** DDC.211

Level adjustment **Macadam 8/11 mm**



**STEP 5. Installation of aeration well**

Install the aeration well at a low point so that water is directed into the well. Place it so that the perforated sides of the well are above the Stockholm structural soil layer and level with the aeration layer. Level adjustment must be carried out with macadam 8/11 mm.

The aeration well is equipped with a sand trap to enable regular cleaning and holes in the bottom. Install one aeration well per tree.

Aeration well **AMA** PDY.6
Sand trap volume 60 l

Level adjustment **Macadam 8/11 mm**

**STEP 6. Laying out aeration layer**

Lay out and pack aeration layer. Check that the aeration well is at the correct level (see STEP 5) and that the material in the aeration layer falls through the openings in the side of the tree pit foundation. If the aeration layer collapses into the tree pit foundation in an uncontrollable manner, 90/150 mm stone shards can be stacked to cover the openings.

Stockholm structural soil **AMA** DCL.131

Macadam 32/63 mm layer thickness 150 mm

**STEP 7. Laying out leveling layer and geotextile**

Lay out and pack the leveling layer on top of the aeration layer. Then spread geotextile over the entire planting bed. It is important that the geotextile is folded up against tree pit foundations, wells and kerbstones to prevent base course from mixing with aeration layer. Therefore, cut the edges of the geotextile after the base course has been laid out.

Stockholm structural soil **AMA** DCL.131

Macadam 8/11 mm layer thickness 50 mm

Geotextile **AMA** DBB.3133
Class N3

**STEP 8. Superstructure and planting**

Adapt the superstructure to the requirements of the current base course.

Once the base course is complete, the tree is planted with the root ball resting on the Stockholm structural soil. The root collar of the tree is placed at the same level as in the nursery - if necessary, adjust the height with 32/63 mm macadam at the bottom of the tree pit. Cut the net around the root ball and fold down. Fill space around the root ball with plant substrate.

Stockholm structural soil **AMA** DCL.131

Plant substrate (macadam 2/6 mm + 25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**)

Planting **AMA** DDB.22

**STEP 9. Completion**

Install tree grille if necessary. The tree grille must be made of ductile iron or corten. Ensure that the macadam fills up against the tree grille to prevent damage under load.

Mount the tree guard and, if necessary, bind the tree with tie webbing.

Covering layer (macadam 4/8 mm or 2/6 mm)

Tree grille **AMA** DDC.212
minimum 1400x1400 mm

Tree guard **AMA** DDC.213

* 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

** The compost must be well humified.

Photo: Hildegun Varhelyi

Tree in hard surface: biochar-macadam

A planting bed with biochar-macadam consists of packed macadam with incorporation of biochar. Read the entire description carefully before work. Standard detail drawing and a template for the control plan are available as appendices.

SEE ALSO:
APPENDIX **Control plan**
Standard detail drawing **THVB021**

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.



STEP 1. Documentation and control

Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Planting bed with biochar-macadam

AMA DCL.149

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** YCE.112

Control plan **AMA** YCQ.1112



STEP 2. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Geomembranes are placed on the excavation wall facing the property to prevent water from the planting bed from penetrating the foundation.

Geotextile **AMA** DBB.3133

Class N3

Geomembrane **AMA** DBB.3133

LDPE geomembrane. Thickness 0.5 mm. Made in one layer, joints are overlapped by 0.5 m.

Planting bed with biochar-macadam

AMA DCL.149

Loosening of subgrade depth 200 mm



STEP 3. Laying out biochar-macadam

Add a 50 mm thick layer of unfertilised biochar on the subgrade. Next, lay out 600 mm biochar-macadam (macadam 32/90 mm with 15 percent by volume mixture of nutrient-enriched** biochar and compost). The size of the stones should be as even as possible. Compact with a vibratory plate compactor with at least four passes of 400 kg. Repeat laying of biochar-macadam and packing, layer by layer, until the prescribed depth is reached.

Planting bed with biochar-macadam

AMA DCL.149

Unfertilized biochar layer thickness 50 mm*

Biochar-macadam (macadam 32/90 mm + 15 percent by volume mixture of 1 part nutrient-enriched** biochar and 1 part compost****) layer thickness 600 mm



Photo: Hildegun Varhelyi



STEP 4. Installation of tree pit foundation

Install the tree pit foundation so that the biochar-macadam falls in through the openings in the side. The closed upper part of the foundation must be adapted to the thickness of the base course to prevent it from falling into the tree pit and mixing with the plant substrate. This creates stability and prevents soil subsidence around the tree pit in the future. Level adjustment must be carried out with macadam 8/11 mm.

Tree pit foundation **AMA** DDC.211

Level adjustment **Macadam 8/11 mm**

* Unfertilized biochar on the subgrade surface is included in the total height of biochar-macadam.

** 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

*** The compost must be well humified.



STEP 5. Installation of aeration well

Place the aeration well at a low point so that water is directed into the well. Install the aeration well so that the perforated sides of the well are level with the top 200 mm of the biochar-macadam layer. In a radius of half a meter around the well, macadam without biochar should be used to facilitate infiltration. Level adjustment must be carried out with macadam 8/11 mm.

The aeration well is equipped with a sand trap to enable regular cleaning and holes in the bottom. Install one aeration well per tree.

Aeration well **AMA** PDY.6

Sand trap volume 60 l

Level adjustment **Macadam 8/11 mm**



STEP 6. Laying out aeration layer

Lay out and pack aeration layer. Check that the aeration well is at the correct level (see STEP 5) and that the material in the aeration layer falls through the openings in the side of the tree pit foundation. If the aeration layer collapses into the tree pit foundation in an uncontrollable manner, 90/150 mm stone shards can be stacked to cover the openings.

Planting bed with biochar-macadam

AMA DCL.149

Macadam 32/63 mm layer thickness 150 mm



STEP 7. Laying out leveling layer and geotextile

Lay out and pack the leveling layer on top of the aeration layer. Then spread geotextile over the entire planting bed. It is important that the geotextile is folded up against tree pit foundations, wells and kerbstones. Therefore, cut the edges of the geotextile after the base course has been laid out.

Geotextile **AMA** DBB.3133

Class N3

Planting bed with biochar-macadam

AMA DCL.149

Macadam 8/11 mm layer thickness 50 mm



STEP 8. Superstructure and planting

Adapt the superstructure to the requirements of the current base course.

Once the base course is complete, the tree is planted with the root ball resting on the bio-char-macadam. The root collar of the tree is placed at the same level as in the nursery - if necessary, adjust the height with 32/90 mm macadam at the bottom of the tree pit. Cut the net around the root ball and fold down. Fill space around the root ball with plant substrate.

Planting bed with biochar-macadam

AMA DCL.149

Plant substrate (macadam 2/6 mm + 15-25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**)

Planting **AMA** DDB.22



STEP 9. Completion

Install tree grille if necessary. The tree grille must be made of ductile iron or corten. Ensure that the macadam fills up against the tree grille to prevent damage under load.

Mount the tree guard and, if necessary, bind the tree with tie webbing.

Covering layer (macadam 4/8 mm or 2/6 mm)

Tree grille **AMA** DDC.212
1400x1400 mm

Tree guard **AMA** DDC.213

Photo: Hildegun Varhelyi

* 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

** The compost must be well humified.

Tree in rock dust surface

For trees in a rock dust surface, Stockholm structural soil is laid according to the same method as for a hard surface, with the difference that the aeration well is removed as the gas exchange takes place directly through the soil surface. Tree pit foundations are also excluded. The Stockholm structural soil can be replaced with biochar-macadam. Read the entire description carefully before work. Standard detail drawing and a template for the control plan are available as appendices.

SEE ALSO:
APPENDIX Control plan
Standard detail drawing THVB023

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.



STEP 1. Documentation and control

Submit soil analysis with particle size distribution curve and nutrient analysis of all soils used in the planting bed to the client. Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Stockholm structural soil **AMA** DCL.131

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** YCE.112

Control plan **AMA** YCQ.1112



STEP 2. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Geomembranes are placed on the excavation wall facing the property to prevent water from the planting bed from penetrating the foundation.

Geomembrane **AMA** DBB.3133
Class N3

Geomembrane **AMA** DBB.3133
LDPE geomembrane. Thickness 0.5 mm. Made in one layer, joints are overlapped by 0.5 m.

Stockholm structural soil **AMA** DCL.131

Loosening of subgrade depth 200 mm



STEP 3. Construction of Stockholm structural soil *

Start by adding a 50 mm thick layer of unfertilized biochar on the subgrade.

Then lay down a 250-300 mm thick layer of 90/150 mm stone shards. The size of the stones should be as even as possible to provide space for the roots to grow. Compact with a vibratory plate compactor with at least four passes of 400 kg.

Place a maximum of 20 mm of plant substrate type B on top of the compacted stones. Flush the soil down between the stones with a narrow jet and high pressure. Add a new layer of soil (max 20 mm) and flush it into the cavities. Repeat until the layer of stone shards is saturated. No soil must be left on top – the upper surface of the stones should emerge from a soil saturated layer.



Repeat the layering of stone shards and flushing of soil until the prescribed depth of the Stockholm structural soil is reached.

Stockholm structural soil **AMA** DCL.131

Unfertilized biochar layer thickness 50 mm
Macadam 90/150 mm layer thickness ~600 mm

Plant substrate type B** 0,25 m³/1 m³ macadam

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23



STEP 4. Laying out aeration layer

Lay out and pack aeration layer.

Stockholm structural soil **AMA** DCL.131

Macadam 32/63 mm layer thickness 200 mm

* In case of construction with biochar-macadam this step is replaced with Step 3 Laying out biochar-macadam in Appendix B "Implementation description Tree in hard surface: biochar-macadam"

** For the soil to be easily flushed down, the organic matter content should be less than 2% by weight and the clay content 4–8% by weight.

**STEP 5. Laying out leveling layer**

Lay out and pack the leveling layer on top of the aeration layer.

Stockholm structural soil **AMA** DCL.131

Macadam 8/11 mm layer thickness 50 mm

**STEP 6. Planting***

Dig a pit and plant the tree with the root ball resting on the Stockholm structural soil. The root collar of the tree is placed at the same level as in the nursery - if necessary, adjust the height with 32/63 mm macadam at the bottom of the tree pit. Cut the net around the root ball and fold down.

Stakes are established before backfilling. Binding and anchoring of larger trunks is carried out according to standard detail drawing DDC.11:2 in AMA Anläggning 13. Fill space around the root ball with plant substrate.

Stockholm structural soil **AMA** DCL.131

Plant substrate (macadam 2/6 mm + 15-25 percent by volume mixture of 1 part nutrient-enriched** biochar and 1 part compost***)

Planting **AMA** DDB.22

Tree support **AMA** DDC.11

**STEP 7. Completion**

Lay out the rock dust mixture. Surface course must be packed with a vibratory plate compactor with a static line load of at least 15 kN/m, at least two passes. If a roller cannot be used, use an alternative compression method which gives a satisfactory result. Close to existing trees, the vibrator must be switched off or a smaller vibratory plate compactor must be used.

Surface course **AMA** DCB.42

50 percent by volume crushed rock 0/8 mm and 50 percent by volume pumice 2/8 mm layer thickness 100 mm

Photo: Lovisa Hell

* In case of construction with biochar-macadam, this step is replaced with **Step 6 Planting** in Appendix D "Implementation description Tree in vegetation area: biochar-macadam".

** 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

*** The compost must be well humified.

Tree in vegetation area: biochar-macadam

For trees in a vegetation area, a plant bed is created with biochar-macadam, similar to the method used for hard surfaces. Tree pit foundations and tree grilles are excluded as well as aeration wells since the gas exchange takes place directly through the soil surface. Stormwater from surrounding hard surfaces can be led to the plant bed via a well with a side inlet. Read the entire description carefully before work. Standard detail drawing and a template for the control plan are available as appendices.

SEE ALSO:
APPENDIX **Control plan**
Standard detail drawing **THVB024**

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.



STEP 1. Documentation and control

Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Planting bed with biochar-macadam

AMA DCL.149

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** YCE.112

Control plan **AMA** YCQ.1112



STEP 2. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Geomembranes are placed on the excavation wall facing the property to prevent water from the planting bed from penetrating the foundation.

Planting bed with biochar-macadam

AMA DCL.149

Loosening of subgrade depth 200 mm

Geomembrane **AMA** DBB.3133

LDPE geomembrane. Thickness 0.5 mm. Made in one layer, joints are overlapped by 0.5 m.



STEP 3. Laying out biochar-macadam

Add a 50 mm thick layer of unfertilised biochar on the subgrade. Next, lay out 350-650 mm biochar-macadam (macadam 32/90 mm with 15 percent by volume mixture of nutrient-enriched* biochar and compost). The size of the stones should be as even as possible. Compact with a vibratory plate compactor with at least four passes of 400 kg. Repeat laying of biochar-macadam and packing, layer by layer, until the prescribed depth is reached.

Planting bed with biochar-macadam

AMA DCL.149

Unfertilized biochar layer thickness 50 mm*

Biochar-macadam (macadam 32/90 mm + 15 percent by volume mixture of 1 part nutrient-enriched** biochar and 1 part compost***) layer thickness 350-650 mm



STEP 4. Laying out aeration layer

Lay out and pack aeration layer. Check that the aeration well is at the correct level (see STEP 5 Appendix B) and that the material in the aeration layer falls through the openings in the side of the tree pit foundation. If the aeration layer collapses into the tree pit foundation in an uncontrollable manner, 90/150 mm stone shards can be stacked to cover the openings.

Planting bed with biochar-macadam

AMA DCL.149

Macadam 32/63 mm layer thickness 150 mm



STEP 5. Leveling

Lay out the leveling layer on top of the aeration layer.

Planting bed with biochar-macadam

AMA DCL.149

Macadam 8/11 mm layer thickness 50 mm

* Unfertilized biochar on the subgrade surface is included in the total height of biochar-macadam.

** 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

*** The compost must be well humified.

**STEP 6. Cupping of upper surface**

Dimension the thickness of the plant substrate layer depending on the planned vegetation (see below). Shape the surface so that the planting gets a slight slope where stormwater can infiltrate. The plant substrate should connect just below the level of the adjacent hardened surface, so that leaves etc. do not accumulate and prevent the supply of storm water to the plant bed.

Planting bed with biochar-macadam

AMA DCL.149

Plant substrate (macadam 2/6 mm + 25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**) layer thickness for grass surface 150 mm, for perennials and shrubs 450 mm.

Airy support strip (macadam 4/8 mm)

**STEP 7. Planting**

Dig a pit and plant the tree with the root ball resting on the biochar-macadam. The root collar of the tree is placed at the same level as in the nursery - if necessary, adjust the height with 32/90 mm macadam at the bottom of the tree pit. Cut the net around the root ball and fold down.

Stakes are established before backfilling. Binding and anchoring of larger trunks is carried out according to standard detail drawing DDC.11:2 in AMA Anläggning 13. Fill space around the root ball with plant substrate.

Planting bed with biochar-macadam

AMA DCL.149

Plant substrate (macadam 2/6 mm + 15-25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**) layer thickness for grass surface 150 mm, for perennials and shrubs 450 mm.

Planting **AMA** DDB.22

Tree support **AMA** DDC.11

**STEP 8. Completion**

Plant perennials/shrubs or sow grass. Keep a 0.5 m radius around the tree trunk free of vegetation.

Sowing of grass **AMA** DDB.1
with current underlying codes

Planting of shrubs **AMA** DDB.21
with current underlying codes

Planting bed renovation

Planning of the proposed measure (development, conduit excavation, revitalization of trees, etc.) is carried out in parallel with planning of the planting bed renovation, to reach an optimal solution. The chosen design of the planting bed therefore varies from case to case. A template for the control plan is available as an attachment.

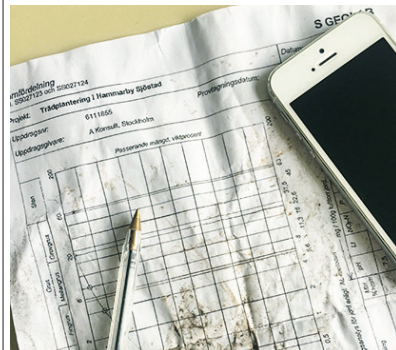
SEE ALSO:
APPENDIX **Control plan**

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.



STEP 1. Evaluation before work

Compile the necessary knowledge base (see "Planting beds in the City of Stockholm" p. 19). Make a professional inventory of the trees and assess the conservation value of the trees. Excavate a test pit to locate roots and document according to checklist. Design the planting bed.



STEP 2. Documentation and control

Submit soil analysis with particle size distribution curve and nutrient analysis of all soils used in the planting bed to the client. Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Planting bed renovation **AMA** DCL.149

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** YCE.112

Control plan **AMA** YCQ.1112



STEP 3. Careful excavation

Take protective measures for the tree trunk, tree crown and nearby root zones that are not affected by the work (see page 20). Roots are exposed with vacuum excavation, compressed air lance or, on a smaller scale, hand excavation. Roots that are at risk of drying out due to exposure must be protected (see "Planting beds in the City of Stockholm" p. 21). Cutting of roots must be done in consultation with the client.

Temporary protection of ground and vegetation

AMA BCB.4

with current underlying codes

Measures in the root zone of trees and shrubs

AMA BCB.51

Shaft for vegetation area **AMA** CBB.14



Kungsbroplan before planting bed renovation (2002).



After planting bed renovation (2013).



STEP 4. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition as well as the planned construction of the planting bed. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Geomembranes are placed on the excavation wall facing the property to prevent water from the planting bed from penetrating the foundation.

Planting bed renovation **AMA** DCL.149

Loosening of subgrade outside root zone depth 200 mm

Geomembrane **AMA** DBB.3133

LDPE geomembrane. Thickness 0.5 mm. Made in one layer, joints are overlapped by 0.5 m.



STEP 5. Installation of wells

Install the prescribed solution for the supply of stormwater and gas exchange, e.g. an aeration well or a well with a side inlet.

Aeration well **AMA** PDY.6

Sand trap volume 60 l

Level adjustment **Macadam 8/11 mm**

Aeration well with side inlet **AMA** PDY.6

with associated conduits (AMA code project specific)



STEP 6. Refill

Refill with biochar-macadam or aeration layer and controlled-release fertiliser. Material and layer thickness are chosen depending on the project-specific situation. Plant substrate is placed closest to the roots as protection.

Planting bed renovation **AMA** DCL.149

Alternative A: Biochar-macadam (macadam 32/90 mm + 15 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**) *layer thickness varies*

Alternative B: Aeration layer (pumice 2/8 mm or macadam 32/90 mm) *layer thickness varies*

Plant substrate (macadam 2/6 mm + 15-25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**)



STEP 7. Completion

Completion is adapted to the chosen surface material.

Hard surfaced areas: Lay out and pack leveling layers. Lay out geotextile. Complete with prescribed superstructure and surface layer.

Planting bed renovation **AMA** DCL.149

Leveling (macadam 8/11 mm) *layer thickness 50 mm*

Geotextile **AMA** DBB.3133
Class N3

Covering layer (macadam 4/8 mm or 2/6 mm)

See also **Appendix B** Tree in hard surface: biochar-macadam, step 7.



Rock dust surface: Lay out and pack leveling layers. Lay out the rock dust mixture. Surface course must be packed with a vibratory plate compactor with a static line load of at least 15 kN/m, at least two passes. If a roller cannot be used, use an alternative compression method which gives a satisfactory result. Close to existing trees, the vibrator must be switched off or a smaller vibratory plate compactor must be used.

Planting bed renovation **AMA** DCL.149

Leveling (macadam 8/11 mm) *layer thickness 50 mm*

Surface course **AMA** DCB.42

50 percent by volume crushed rock 0/8 mm and 50 percent by volume pumice 2/8 mm *layer thickness 100 mm*

See also **Appendix C** Tree in rock dust surface, step 5 and 7.



Vegetation area: Dimension the thickness of the plant substrate layer depending on the planned vegetation. Plant shrubs/perennials or sow grass.

Planting bed renovation **AMA** DCL.149

Leveling (macadam 8/11 mm) *layer thickness 50 mm*

Plant substrate (macadam 2/6 mm + 15-25 percent by volume mixture of 1 part nutrient-enriched* biochar and 1 part compost**) *layer thickness for grass surface 150 mm, for perennials and shrubs 450 mm*

Sowing of grass **AMA** DDB.1
with current underlying codes

Planting of shrubs **AMA** DDB.21
with current underlying codes

See also **Appendix D** Tree in vegetation area: biochar-macadam, step 5, 6 and 8.

* 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

** The compost must be well humified.

Tree in vegetation area: park

This section describes planting beds that are established in existing soil with an undisturbed structure in a park or natural environment. Standard detail drawing and a template for the control plan are available as appendices. Where the soil is compacted, in need of remediation or where the existing soil for other reasons cannot meet the requirements for a good planting bed after soil improvement, a new planting bed is constructed according to **Appendix D** Tree in vegetation area: biochar-macadam.

SEE ALSO:
APPENDIX **Control plan**
Standard detail drawing **THVB025**

AMA AMA (freely translated to General Material and Work Description) codes are descriptive texts about proven solutions for execution and materials.

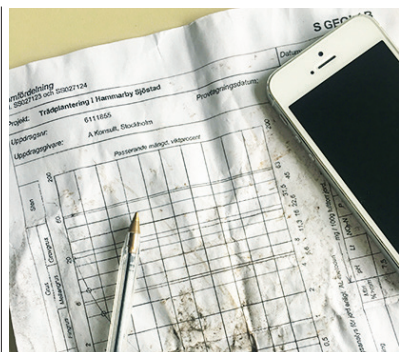


STEP 1. Evaluation before planning

Carry out the necessary investigations to determine the nature of the soil in terms of texture (the soil should be free of deviating or dense layers), structure, bedrock, water table, drainage and weeds. Make an inventory of existing vegetation (species and condition). Excavate a test pit and carry out soil analysis. Document the examinations according to the client's instructions. Decide whether planned works allow the ground surface to be protected against compaction during the construction period. If the investigation shows that existing soil is not suitable for tree planting, a new planting bed must be planned.

See also **Appendix D** Tree in vegetation area: biochar-macadam.

Photo: Anders Ohlsson Sjöberg



STEP 2. Documentation and control

Submit soil analysis with particle size distribution curve and nutrient analysis on all plant substrates used in the plant bed to the client. Report key stages according to the checklist continuously during the construction process with the help of photo documentation.

Planting bed with existing soil **AMA** DCL.121

Liming **AMA** DCL.22

Fertilization **AMA** DCL.23

Basis for as-built document **AMA** YCE.112

Control **AMA** YCQ.1112



STEP 3. Preparation of subgrade

Examine the subgrade. Adapt measures according to condition. Water must not remain on the subgrade surface nor run through too quickly. Dense subgrade surfaces may require drainage, compacted subgrades may require loosening with an excavator and excessively permeable subgrades may need to be sealed. Also loosen soil on the sides of the planting bed.

Loosening of subgrade **AMA** DCL.121
depth 200 mm

Photo: Anders Ohlsson Sjöberg



Photo: Lovisa Hell



STEP 4. Soil improvement of planting bed

Improve existing soil based on completed analysis and with regard to planned vegetation. Amend the planting bed as needed to improve its water and nutrient holding capacity by mixing in suitable substrates such as pumice 2/8 mm or nutrient-enriched* biochar. Fertilize as necessary. Level the surface and, if possible, form weak depressions along planting beds where stormwater can infiltrate.

Soil improvement **AMA** DCL.2
with current underlying codes

* 50 kg organic fertiliser NPK 5-1-4/ m³ or 5 kg mineral fertiliser NPK 5-1-4 with micronutrients/ m³. Organic manure must be hygienised.

Photo: Kari Kohvakka for Stockholm Vatten och Avfall



STEP 5. Planting of trees

Dig a pit in the improved soil and plant the tree with the root ball resting on the subgrade. The root collar of the tree is placed at the same level as in the nursery - if necessary, adjust the height with 32/90 mm macadam at the bottom of the tree pit. Cut the net around the root ball and fold down. Stakes are established before backfilling. Binding and anchoring of larger trunks is carried out according to standard detail drawing DDC.11:2 in AMA Anläggning 13.

Planting **AMA** DDB.22

Tree support **AMA** DDC.11

Photo: Lovisa Hell

**STEP 6. Completion**

Plant perennials/shrubs or sow grass. Keep a 0.5 m radius around the tree trunk free of vegetation.

Sowing of grass **AMA** DDB.1
with current underlying codes

Planting of shrubs **AMA** DDB.21
with current underlying codes

Projekt: **Växtjord för salthaltiga markförhållanden - Typ B**

Datum: 2008-11-27

Uppdragsnr:

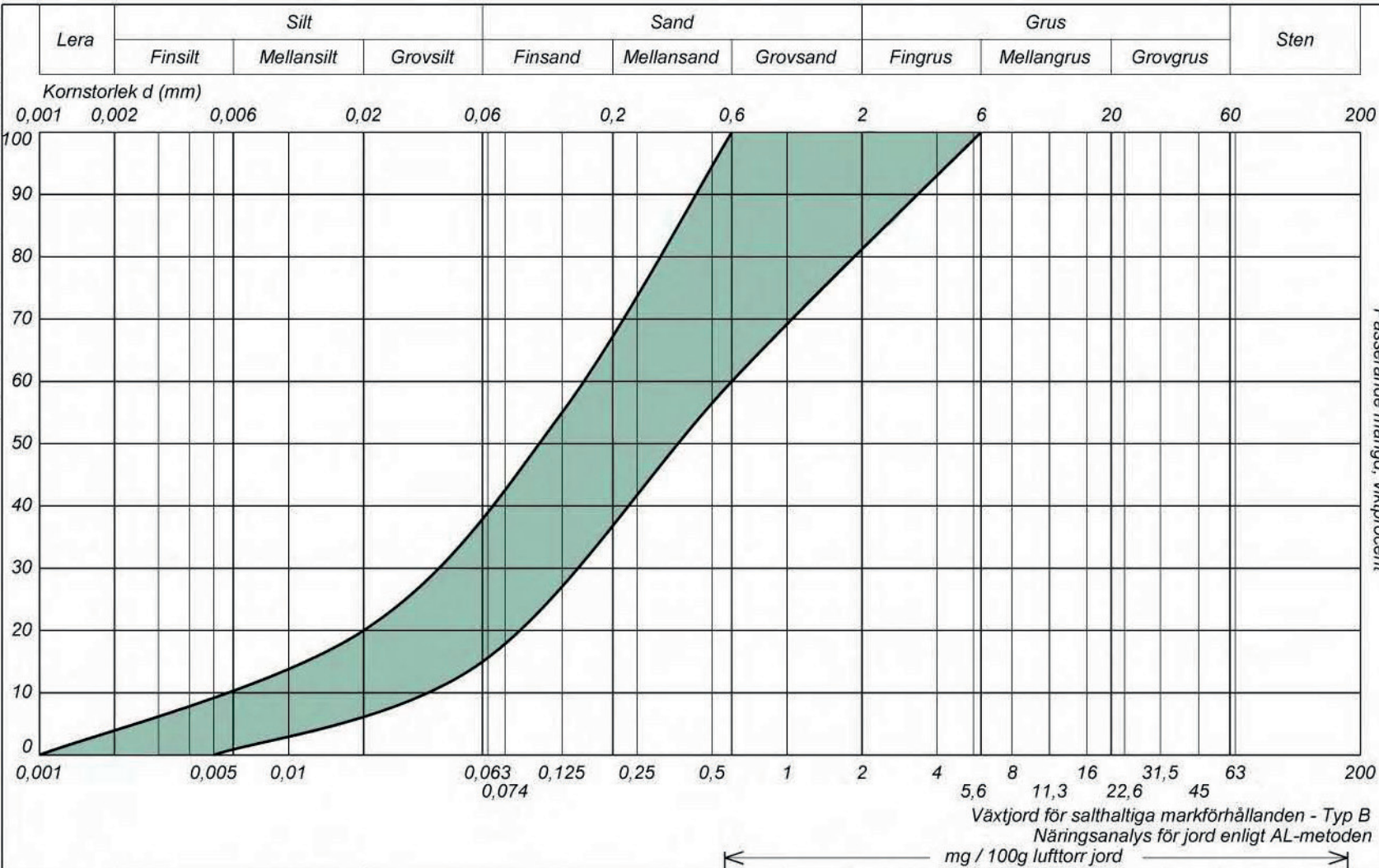
Provtagningsdatum:

Löp-nr: 000

Uppdragsgivare:

Gransk./Sign.:

Passerande mängd, viktprocent



Växtjord för salthaltiga markförhållanden - Typ B
Näringsanalys för jord enligt AL-metoden

Plats	Prov-beteckning	Benämning	pH	Lt	NO ₃ -N	P	K	Mg	Sulfid-svavel
...	...		6,0 - 7,0	1,5 - 5,0		4 - 8	8 - 16	4 - 8	0

Växtjorden ska ha en humushalt 5 - 8 vikt % till ett djup av 400 mm.
Mineraljorden, vid djup >400 mm, skall ha en humushalt på < 2 vikt%.