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Lesnická a dřevařská fakulta Mendelova univerzita v Brně

NATURE AND LANDSCAPE MANAGEMENT STANDARDS

ARBORIST STANDARDS	**PROTECTION OF WOODY PLANTS DURING DEVELOPMENT ACTIVITIES**	**SPPK A01 002:2017**
SERIES A		

Protection of woody plants during development activities

Schutz der Bäume und Sträucher bei Bauaktivitäten

This standard is intended to define procedures related to selection and protection of woody plants in connection with development activities.

References:

ČSN 83 9001 (1999): Vegetation technology in landscaping - Terminology - Fundamental special terms and definitions
ČSN 83 9061 (2006): Vegetation technology in landscaping - Protection of trees, plantations and vegetation areas during construction work
ČSN 73 6005 (1994): Space arrangement of conduits of technical equipment

Act no. 20/1987 Coll. on State Heritage Management, as amended
Act no. 89/2012 Coll., the Civil Code, as amended
Act no. 114/1992 Coll. on Nature and Landscape Protection, as amended
Act no. 254/2001 Coll. on Waters and on amendment of certain acts (Waters Act), as amended
Act no. 183/2006 Coll. on Spatial Planning and Building Rules (Building Act), as amended
Act no. 326/2004 Coll. on Medical Plant Care and on amendment of certain acts, as amended
Act no. 360/1992 Coll. on Exercise of the Authorised Architect Profession and Authorised Construction Engineer and Technician Profession, as amended
Act no. 266/1994 Coll. on Railways, as amended
Act no. 458/2000 Coll. on Requirements for Business and Public Administration in Energy Industries (Energy Act), as amended
Act no. 500/2004 Coll., Rules of Administrative Procedure, as amended
Act no. 13/1997 Coll. on Roads, as amended
Act no. 100/2001 Coll. on Environmental Impact Assessment and on amendment of certain acts, as amended

Decree no. 189/2013 Coll. on Protection of woody plants and permission of their cutting as amended by Decree no. 222/2014 Coll.
Decree no. 395/1992 Coll., implementing certain provisions of Czech National Council Act no. 114/1992 Coll. on Nature and Landscape Protection, as amended
Decree no. 499/2006 Coll. on Building documentation, as amended
Decree no. 503/2006 Coll. on Details of spatial planning decision-making, spatial measures and building rules, as amended
Decree no. 500/2006 Coll. on Territorial analytical documents, spatial planning documentation and methods of record-keeping on spatial planning activities, as amended

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Contents

1. Standard purpose and contents

The standard "Protection of woody plants during development activities" defines a selection of woody plants potentially affected by development activities, design and execution of work procedures connected with implementation of their protection and cultivation measures.

The purpose of **protection of woody plants** is to minimise occurrence of damage to woody plants during development activities planned and in progress.

For the purposes of this standard, **development activities** refers to construction and demolition of all kinds of structures, including associated activities.

1.1 Legal framework

1.1.1 The legal context of development activities is an extensive and complex issue. The legal framework mentioned here therefore only includes the most important context.

1.1.2 **Act no. 114/1992 Coll. on Nature and Landscape Protection**, as amended; protection of trees during development activities is mostly concerned by provisions relating to general protection of woody plants from damage and destruction (Section 7), cutting (Section 8) and substitute planting (Section 9). The Act also defines the obligation for investors intending major interventions as part of development activities to arrange the performance of a scientific survey and a written assessment of the impact of the intended intervention on plants and animals (Section 67), so-called biological assessment. The investor only has this obligation if the nature protection authority applicable for permitting the intended project decides that it is necessary. In specially protected areas, some activities (e.g., project announcement, zoning decision, zoning approval, building permit, etc.) require a binding position statement of the nature protection authority (Section 44). In selected specially protected areas, development activities are prohibited (1st zones of NP (Section 16, Para. 2, item (a)), 1st zones of PLA (Section 26, Para. 2, item (a)), NNR (Section 26, item (b)), NR (Section 36, Para. 1, item (c)).

1.1.3 **Decree no. 189/2013 Coll.**, on Protection of woody plants and permission of their cutting, as amended by Decree no 222/2014 Coll., makes a detailed specification of requirements for protection of woody plants and, in particular, defines conditions for permission of cutting of woody plants and defines terms related to cutting of woody plants. Among other things, it also defines unpermitted interventions in woody plants, which is of importance during development activities.

1.1.4 **Decree no. 395/1992 Coll.**, implementing certain provisions of Czech National Council Act no. 114/1992 Coll. on Nature and Landscape Protection, as amended, specifies things such as protection of specially protected species. It also lays down requisites for biological assessment, which is necessary during development representing a major intervention in nature and landscape, where such assessment is

required by the nature protection authority.

1.1.5 **Act no. 254/2001 Coll.** on Waters and on amendment of certain acts (Waters Act), as amended, Section 49, defines authorisations of watercourse administrators. Among other things, they now may plant and remove trees and shrubs within a certain distance from the bankline for reasons of watercourse bed management and in certain other situations. Section 51 then defines obligations of owners of land adjoining watercourse beds. For example, water management authorities may prohibit such owners from cutting trees and shrubs providing bed stability. In addition, the Act defines the ban on planting of woody plants on protective dams along hydraulic structures (Section 58, Para. 2) and obligations of owners of hydraulic structures, including the obligation to remove self-seeding woody plants (Section 59, Para. 1).

1.1.6 **Act no. 266/1994 Coll.**, on Railways, as amended, Section 10, stipulates that owners of properties adjoining railway lines are required to tolerate necessary measures on their land, e.g., to prevent falling of trees or their parts.

1.1.7 **Act no. 458/2000 Coll.**, on Requirements for Business and Public Administration in Energy Industries (Energy Act), as amended; under this Act, the transmission system operator has the right to remove and prune trees and other vegetation, dispose of removed and pruned trees and other vegetation endangering the safe and reliable operation of transmission system equipment in cases where the owner or user has not done so after a notification and definition of extent (Section 24, Para. 2). In addition, the Act prohibits the planting of hop fields and permanent vegetation stands within the protective zone of overhead power lines, and leaving vegetation to grow above 3 m (Section 46, Para. 9).

1.1.8 **Act no. 183/2006 Coll.** on Spatial Planning and Building Rules (Building Act), as amended, defines the rights and obligations in the area of spatial planning, zoning decision-making and building rules. The issue of protection of trees during development activities relates to all the areas listed. A development activities have to be in accordance with the documentation (e.g., spatial development principles, land-use plans). The most important zoning decision is the project location decision, in which the concerned authority is the nature protection authority, which issues binding position statements in the proceeding. The same applies to the building permit proceeding and demolition proceeding. Another important institute in terms of protection of trees during development activities is the field inspection, to which the building authority has to invite the other concerned authorities (Section 133, Para. 4).

1.1.9 **Decree no. 499/2006 Coll.** on Building documentation, as amended, defines the requisites for contents of documentation for issuing a decision pursuant to the Building Act. Requirements for cutting of woody plants are a mandatory part of the documentation for the issuing of a project location decision, as is the part describing environmental impacts of the project.

1.1.10 **Act no. 500/2004 Coll.**, Rules of Administrative Procedure, as amended, defines procedures for executive authorities, authorities of territorial self-governing units (municipalities and regions) and other authorities exercising public administration in decision-making on rights and obligations and determining the existence of

administrative relationships. It employs the subsidiarity principle, i.e., provisions of the Rules of Administrative Procedure apply unless a special Act says otherwise.

1.1.11 **Act no. 13/1997 Coll.** on Roads, as amended, defines categories of roads, their construction and conditions for use, as well as rights and obligations of road owners and users. An important provision in relation to protection of trees and development activities is Section 15, dealing with roadside vegetation. Pursuant to the Act, such vegetation must not endanger the safety of road use. In addition, the Act defines the road protective zone, in which certain circumstances prohibit the planting of trees or tall shrubs and cultivation of crops that would interfere with views necessary for road traffic safety due to their height and with respect to the ground elevation (Section 33). Pursuant to the Act, owners of land adjoining roads are required to tolerate necessary measures to prevent falling of trees (Section 35, Para. 1).

1.1.12 **Act no. 20/1987 Coll.** on State Heritage Management, as amended, defines, among other things, the capacity of regional authorities to specify, after negotiation with applicable authorities, which properties that are not cultural monuments but are within a heritage reserve or a heritage zone, or what types of works on them, including planting and cutting of woody plants in public areas exclude the owner's obligation to apply for a prior binding position statement of the authority of the municipality with extended powers that is otherwise necessary for such works (Sections 6a and 14). The regional authority does so by means of protection plans, issued in the form of general measures.

1.1.13 **Act no. 89/2012 Coll.**, the Civil Code, as amended, makes comprehensive definitions of private law relationships, and rights and obligations arising from such relationships In relation to protection of trees during development activities, the important provisions are those on prevention of damage and commitments arising from violations and liability for damage. Among other things, the Act defines the rule that everyone, under certain circumstances, is required to act so as to prevent illegitimate harm to the freedom, lives, health or property of others. Therefore, anyone doing development activities has to act so as to prevent harm to other people's trees, for example.

1.1.14 **Act no. 100/2001 Coll.** on Environmental Impact Assessment and on amendment of certain acts, as amended, defines the process of assessment of environmental impact of plans and concepts. The objective of the Act is to integrate environmental protection issues into certain decision-making processes. The purpose is to determine, describe and comprehensively assess the expected impacts of plans and concepts in development on the environment and public health in all critical aspects. The so-called EIA process assesses construction projects, activities and technologies specified in Annex 1 to the Act. Projects assessed in the EIA process include buildings, roads, manufacturing halls, etc.

1.2 Stages of protection of woody plants during development activities

1.2.1 The **construction project planning (surveying)** stage involves assessment of woody plants potentially affected by the development activities and selection of woody plants to be protected (see Chapter 2).

1.2.2 The **construction project development** stage involves an assessment of the impact of the planned development activities on woody plants, delineation of protective zones (see Chapter 3), and a definition of the extent and type of protective measures (see Chapter 4), including follow-up management and their pricing.

1.2.3 The **construction project execution** stage involves the activity of the expert supervisor (see Chapter 6) and the implementation of protective measures, including compensatory measures as necessary.

1.2.4 **Follow-up management** (see Chapter 5) proceeds for at least two years after the completion of the development activities.

2. Assessment and selection of woody plants for protection

2.0.1 Assessment and selection of woody plants for protection always takes place in the construction project planning (surveying) stage or as the first step in developing the project documentation in cooperation among the project planner, landscape architect and arborist.

2.0.2 Selection of woody plants for protection takes place in cases where project location or associated activities can be expected to affect woody plants or their growth conditions. When planning/implementing any development activity regardless of the permitting regime pursuant to the Building Act (no. 183/2006 Coll.).

2.1 Assessment of woody plants

2.1.1 A dendrological survey has to be carried out within the construction site boundaries before design/implementation of protection of trees during development activities.

2.1.2 The assessment includes trees within a distance of less than 5 m from the construction site boundaries and other areas that may be affected by the development activities. The distance is measured from the point of trunk contact with soil (edges of root beginnings).

2.1.3 In case the boundaries of the construction site or its part are changed in a later phase, the dendrological survey has to be updated or extended.

2.1.4 The methodology and scope of the dendrological survey are defined by SPPK A01 001 – Assessment of tree condition, and SPPK A02 008 – Woody plant stand establishment and management.

2.2 Categories of trees designated for protection

2.2.1 Based on the assessment, trees designated for protection shall be divided into the following categories, which define priorities for their retention while locating the project:

A – trees of great value and quality, designated clearly for retention and protection,

B – trees of medium value and quality, recommended for retention,

C – trees of little value and quality, possible to transplant or remove as required by the construction plan.

Below are characteristics of trees included in each category, including an approximate reference for classification under SPPK A01 001 – Assessment of tree condition.

2.2.2 **Category A** typically includes:

trees protected by a special regulation (such as memorial trees pursuant to Act no. 114/1992 Coll.),

- backbone trees of a stand or group with a long-term prospect,
- trees of major functional value (such as composition, landscaping, historic, biological, trees comprising a biotope for specially protected species),
- senescent trees with a prospect (see SPPK A02 009 – Special treatment of trees),
- trees of interesting taxa.

2.2.3 **Category B** typically includes:

- trees with long-to-medium-term prospects,
- trees of impaired health condition (approximately level 2-3),
- trees of impaired vitality (approximately level 2-3),
- trees of impaired stability (approximately level 2-3),

unless classified in category A for other reasons.

2.2.4 **Category C** typically includes:

- trees in the phase of acclimatisation, and acclimatised trees capable of being transplanted,
- trees with medium-to-short-term prospects without major value at their current site,
- trees of significantly impaired health condition (approximately level 3-4),
- trees of significantly impaired vitality (approximately level 3-4),
- trees of upset stability (approximately level 3),

unless classified in category A for other reasons.

2.3 Shrubs and climbing plants designated for protection

2.3.1 Protective measures shall also be proposed for shrubs and climbing plants if development activities may negatively affect their functions, vitality or stability.

2.4 Cutting of woody plants

2.4.1 Trees designated for removal (not classified in categories A to C) have to be cut so as to prevent conflict with development activities.

2.4.2 The cutting shall respect SPPK A02 005 – Cutting of trees.

2.4.3 It is advisable to consider woody plant transplantation as an alternative to cutting in justified cases. Transplantation shall respect SPPK A02 009 – Special interventions in trees.

3. Delineation of protective zones for woody plants

3.0.1 Delineation of the extent of the protective root area and any other protective zones typically proceeds as part of the project documentation development.

3.0.2 Delineated protective zones must not be smaller than protective zones for trees defined by acts and decrees of law (e.g., protective zone for memorial trees pursuant to Act no. 114/1992 Coll.).

3.0.3 The size of the protected root area is determined from the point of contact of the trunk with soil surface.

3.0.4 Intervention in the protected root area refers to any excavation activity (regardless of the trench depth), earth backfills, storage of materials and heavy machinery traffic.

3.0.5 For trees with multiple trunks, the trunk thickness is the diameter of the substitute trunk[1].

3.1 Protected root area for a tree in an open area

3.1.1 It is calculated in cases where development activities are designed that interfere with the root system of trees without an evident major effect on root growth in the rootable area.

3.1.2 The protected root area is determined is the circular area with a radius equalling the product of the trunk diameter at breast height and the following coefficient, determined by classification of each tree in a category pursuant to 2.2 above (see Annex 3, Figure 1):

A	10
B	7
C	5

3.2 Protected root area for a tree in a restricted rootable area

3.2.1 It is determined in the direction in which the tree's rootable area is restricted in growth by an existing solid obstacle (for example, a stable building foundation) within the protected root area pursuant to 3.1 above.

3.2.2 The size of the restricted protected root area in the direction towards the obstacle is at

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[1] For the purposes of cumulative expression of the thickness of the substitute trunk in a tree with multiple trunks, the calculation of substitute trunk thickness may use conversion from all the trunks using the following formula:

$$D = \sqrt{D_{max}^2 + D_{ostatní}^2}$$

where D_{max} is the diameter of the thickest trunk and D_{others} is the arithmetic mean of diameters of the other trunks.

least equal to the trunk diameter at the point of contact with soil[2], but not less than 500 mm (see Annex 3, Figure 4), to enable radial growth increments to the tree.

3.2.3 In exceptional cases (requirements of 3.2.2 cannot be met), where the intention is to retain even **trees growing closer to the obstacle**, the following has to be assessed:

- obstacle integrity,
- its effect on tree vitality,
- its effect on tree stability,
- taxonomical specificities,
- possibility to increase distance of obstacle from trunk base.

3.2.4 The reduced root area pursuant to 3.2.1 through 3.2.3 above must not be further reduced by the planned development activities.

3.2.5 The procedure for remaining sides of the protected root area is pursuant to 3.1 above.

3.3 Protected root area for shrubs and climbing plants

3.3.1 For shrub species with significant activity of the basal renewal zone (see SPPK A02 003 – Planting and pruning of shrubs and climbing plants) without any clearly discernible trunks and climbing plants of a similar nature, the protected root area is determined as 200 mm from the outermost trunklet.

3.3.2 For other shrubs and climbing plants, the protected root area is determined individually so as to prevent their excessive damage or destruction.

3.4 Protection of woody plants during specific activities

3.4.1 **Open fires** may only be started at distances greater than 20 m from the edge of the projection of tree tops (see Annex 3, Figure 7).

3.4.2 **Sources of heat** (generators, engine sets, etc.) may only be situated at distances greater than 5 m from the edge of the projection of tree tops (see Annex 3, Figure 6).

3.4.3 Increased attention is required during long-term work of construction machinery near tree tops. In such cases, above all, exhaust fumes have to be transported away from contact with the trees' assimilation organs.

3.4.4 Handling of **toxic substances** (such as construction chemicals, fuels, etc.) is not possible within a distance of 10 m from edges of projection of tree tops. The same applies to drains for contaminated water and water used for washing construction machinery.

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[2] The determination of the minimum necessary distance by conversion from the trunk diameter at breast height uses the following conversion formula:

$$D_{stump} = D_{1.3} * 1.37$$

where: $D_{1.3}$ is the trunk thickness at breast height and D_{stump} is the trunk thickness at the stump. The result is rounded to entire centimetres.

4. Protective measures

4.0.1 When preparing construction projects, it is recommended not to design any structures in the protected root areas of woody plants.

4.0.2 All the protective measures have to be defined in project documentation. Protective measures relate mainly to risk prevention in relation to woody plants associated with development activities (see Annex 1).

4.0.3 If designing a structure in the protected root area of woody plants, it is advisable to employ technologies that minimise interference with it, such as trenchless technology[3], overlap of the structure above ground, bridging, etc.

4.0.4 Any construction interference, except trenchless techniques, is not permissible within the minimum protected root area pursuant to 3.2.2 above. The other protective measures (defined herein) have to be respected simultaneously.

4.0.5 Any installed items must not restrict the radial growth increments to tree trunks and root beginnings.

4.1 Delineation of protected root area

4.1.1 Delineation of protected root areas before implementation of any development activities is done using solid fencing at least 1.5 m high.

4.1.2 Depending on local conditions, the protected root area may be delineated alternatively as:

- enclosed area (see 4.1.3),
- non-enclosed area (when implementing linear construction projects, etc.; see 4.1.4),
- without comprehensive delineation of protected root area (see 4.1.5).

4.1.3 **Enclosed protected root area** (see Annex 3, Figure 2) prevents access to the woody plant from all sides. It is defined as the minimum distance from trunk contact with soil (edges of root beginnings) to the fencing equalling the protected root area determined pursuant to 3.

4.1.4 **Non-enclosed protected root area** (see Annex 3, Figure 5) restricts access to the woody plant only on one side – the side where the development activities take

[3] Detailed information on trenchless techniques is available at The International Society for Trenchless Technology website, www.istt.com/guidelines.

place. The sides of a non-enclosed protected area contain partial barriers preventing simple entry to the protected root area during project implementation. The minimum distance from trunk contact with soil to the fencing equals the determined protected root area pursuant to 3.

4.1.5 Implementation of development activities **without delineation of a protected root area** is only possible in the case of:

- development activities in the direction of rootable area restriction (see 3.3),
- development activities in confined areas (such as tree-lined streets).

In such cases, it is necessary to install trunk protection (see 4.2.4) and tree top protection and soil protection from compaction as the case may require (see 4.2.2).

4.1.6 If protecting multiple woody plants in a site, the protected root area is preferably delineated as a common area (see Annex 3, Figure 3).

4.1.7 The protected root area delineation must not be damaged, relocated or removed during the construction work.

4.2 General protective measures in protected root area

4.2.0.1 Any activity within the protected root area, including storage of materials, location of equipment, travel of machinery, excavation work, backfilling, etc., is prohibited. In exceptional cases, the procedure shall follow 4.2.1 through 4.2.3 above.

4.2.0.2 During development activities, the risk of damage to aboveground parts of trees by development activities and machinery has to be minimised. In cases of increased risk of damage, the following procedures have to be respected.

4.2.1 Protection of vegetation soil layer in protected root area

4.2.1.1 If travel of persons or equipment or storage of inert or excavated materials is necessary in the protected root area, soil has to be protected from compaction and other protective measures have to be adopted as necessary.

4.2.1.2 Protection of soil surface from compaction is done depending on the expected loads (see Annex 2).

4.2.1.3 Installation and removal of soil surface protection proceeds so as not to compact the soil surface. It shall remain on the site for the absolutely necessary period of time.

4.2.1.4 Both temporary and permanent storage of excavated and construction materials or equipment on soft soil surface without compaction protection installed is inadmissible.

4.2.1.5 If entry to the protected root area is possible, the trunk and tree top have to be protected pursuant to 4.2.4 below.

4.2.2 Excavation works and protection of roots in protected root area

4.2.2.1 Trenches have to be made using considerate techniques, such as the supersonic air spade, pressurised water or manual excavation and selective access to exposed roots.

4.2.2.2 Roots up to 30 mm in diameter at the edge of a trench towards the tree can be broken easily.

4.2.2.3 Roots from 31 to 50 mm in diameter at the edge of a trench towards the tree shall be retained. If they have to be broken, individual assessment by the expert supervisor is required. If a root has to be broken, it has to be cut smooth and treated adequately to prevent drying and frost.

4.2.2.4 Roots above 50 mm in diameter have to be retained without damage and protected against drying and effects of frost. Only in exceptional cases may the expert supervisor decide that they be broken, including subsequent tree stability analysis.

4.2.2.5 Walls of an open trench in the direction towards the tree have to be adequately protected from drying and effects of frost. Open trench time has to be minimised. The protection is possible using, for example:

- covering of the wall with periodically moistened fabric,
- covering of the trench wall with a suitable material,
- installation of a bushing and immediate backfilling.

4.2.2.6 In order to promote adaptation of the root system, a **root curtain** can be installed (see Annex 3, Figure 10).

4.2.2.7 The root curtain shall be installed one growing season before the start of the construction project, respecting 4.2.2.2 through 4.2.2.3.

4.2.2.8 The root curtain has to pervade the entire depth of the rootable area up to the construction trench depth at most; a depth of 700 mm is usually enough. The outer side of the root curtain (away from the tree) is sealed with nonwoven fabric and secured against landslide. A substrate capable of good water retention and air penetration shall be added to the roots.

4.2.2.9 The root curtain must be periodically watered pursuant to 4.3.1. Root curtains have to be kept moist throughout the construction period.

4.2.2.10 **Underground public technical infrastructure networks** in the protected root area are preferably laid in protectors.

4.2.3 Landscaping and surface sealing

4.2.3.1 If the original ground level cannot be retained, necessary backfilling in the protected root area has to follow the principles specified below.

4.2.3.2 Backfilling on surface not compacted yet has to be spread closer to the trunk than its diameter at its contact with soil, but no less than 500 mm from it (see Annex 3, Figure 4).

4.2.3.3 The backfilling should not use impermeable materials (for example, high clay content).

4.2.3.4 If the ground level has to be raised permanently, **backfilling up to 50 mm** can be made all over the surface, while respecting 4.2.3.2.

4.2.3.5 A ground level raise using permeable materials **up to 200 mm high** and sealing of the soil surface with permeable cover is only possible over up to 50% of the protected root area, while respecting 4.2.3.2.

4.2.3.6 For **higher backfilling**, if using materials not conforming to 4.2.3.3, and in cases of necessary sealing of the surface with an impermeable cover, only 30% of the protected root area can be covered.

4.2.3.7 Before the backfilling, all organic material, including vegetation cover, has to be removed from the soil surface. This removal has to proceed carefully (manually) without any significant damage to tree roots.

4.2.3.8 The spreading of the backfill and installation of permeable covers must not result in significant compaction of the ground and damage to roots.

4.2.3.9 **Ground level reduction** may only proceed outside the boundaries of protected root areas, except specifically justified cases (for example, removal of backfills).

4.2.4 Trunk and tree top protection

4.2.4.1 **Trunk protection** is installed outside the tree's root beginnings. The structure has to be solid and has to extend at least 2 m high or up to the tree's bottommost main branching (see Annex 3, Figures 8 and 9).

4.2.4.2 Trunk protection must not be in contact with the surface of the trunk, root beginnings or branches. Adequate upholstery has to be inserted between the trunk and the protective structure to absorb potential impact shocks (see Annex 3, Figures 8 and 9).

4.2.4.3 Trunk protections must not be damaged, relocated or removed during the construction work.

4.2.4.4 Where exposure of trees to solar radiation increases, **trunk protection from bark scorch** has to be considered. This concerns primarily to young trees and taxa with a think bark. The protection shall follow SPPK A02 001 – Planting of trees, or other defined measures with analogous effect as necessary.

4.2.4.5 Conflicts of working areas of construction machinery with tree tops have to resolved in cooperation with the expert supervisor by delineation of work zones. Potential conflicts can be resolved by **local reduction to tree tops** (S-RLSP, S-RLPV) to the necessary extent based on the expert supervisor's approval.

4.2.4.6 Any and all interventions of this type have to conform to SPPK A02 002 – Pruning of trees.

4.2.4.7 The protective measures proposed have to be functional throughout the project-related activities.

4.2.4.8 Exceptional situations require consultation with the expert supervisor.

4.3 Site modification

4.3.1 **Watering of trees** before the start and during development activities is done if necessary, considering the distribution and intensity of precipitation, site conditions and tree dimensions.

4.3.2 The watering should optimally moisturise the entire protected root area. Several repeated instances of watering are optimal.

4.3.3 The watering must not result in excessive wetting of soil and mudding of the soil surface.

4.3.4 If the soil surface is compacted, some of the remedial measures specified in SPPK A02 007 – Modification of woody plant site conditions shall be adopted:

- mulching with organic mulch,
- radial mulching,
- soil aeration without damage to roots.

5. Completion of development activities and follow-up management

5.1 Site handover

5.1.1 The site handover after completion of development activities includes removal of all temporary protective measures and adequate cleaning.

5.2 Follow-up management

5.2.1 In cases of interference with tree tops, shrubs and climbing plants, intervention in protected root areas, implementation of compensatory planting or transplants of woody plants, follow-up management is necessary.

5.2.2 The project has to include definitions of all protective measures and required follow-up management so as to enable their pricing, implementation and inspection of their execution.

5.2.3 The follow-up management consists in inspection of woody plant condition and response to the interventions for at least a period of two years.

5.2.4 The follow-up management may include pruning defined by SPPK A02 002 – Pruning of trees and SPPK A02 003 – Planting and pruning of shrubs and climbing plants.

5.2.5 In justified cases, the follow-up management may include watering and other measures pursuant to SPPK A02 007 – Modification of woody plant site conditions.

5.2.6 Follow-up management of plantings and transplants shall include finishing and development management pursuant to SPPK A02 001 – Planting of trees.

5.2.7 Development management of transplanted woody plants shall include inspection of their root-taking. In the case of withering, appropriate compensation shall follow.

6. Expert supervisor (for protection of woody plants)

6.1 Appointment of expert supervisor

6.1.1 During activities concerned by this standard, it is advisable to appoint an expert to be a supervisor for the activities in progress, depending on the nature of the project.

6.1.2 If appointed, the expert supervisor typically cooperates with the other supervisors (construction, authorial, technical).

6.2 Work content of expert supervisor

6.2.1 Presence at construction site handover.

6.2.2 Acceptance of protective structures and other protective measures, including periodical inspection.

6.2.3 Approval to modifications of delineated protected root areas depending on individual conditions.

6.2.4 Inspection of all trenches at the edge of and within protected root areas upon their opening.

6.2.5 Inspection of adherence to all defined protective measures.

6.2.6 Inspection of site modifications, including execution of planned watering. Definition of changes to watering regime as necessary in connection with changes in site and climate conditions.

6.2.7 Inspection of removal of protective structures and other temporary protective measures.

6.2.8 Inspection of general adherence to industry standards and technical standards relating to subject matter of supervision.

6.2.9 Making of entries in the construction log.

6.2.10 Inspection of execution, extent and quality of follow-up management.

Annex 1 Risks associated with development activities

Trenches and earth backfills
Landscaping, slope changes
Temporary routes for machinery traffic, including construction site entrance and exit
Car and construction machinery parking areas
Delineation of work zones for construction machinery traffic (notably cranes, excavators, etc.).
Construction of drains, including rainwater drains
Areas for location of temporary structures (mobile offices, workshops, storerooms, etc.)
Protection of vegetation areas as per project layout
Areas for material storage and installation of scaffolding and other supporting structures
Areas for mixing (requires sloping management due to potential leaks) and fuel filling
Areas for washing and rinsing of trucks, mixers and wheelbarrows
Sites for waste deposition and areas for fires
Definition of location of fences delineating protected root areas
Barriers to minimise soil erosion

Developed based on: Fite, K., Smiley, T.E. : Managing trees during construction, Best Management Practices, International Society of Arboriculture, Champaign, 2008.

Annex 2 Protection of soil surface from compaction

Load type	Protection type	
pedestrian traffic/small machinery	chips/gravel	200 mm
up to 3.5 t	chips/gravel	200 mm
	geotextile	>200g/m^2
over 3.5 t	chips/gravel	200 mm
	geotextile	>200g/m^2
	distribution boards*	

* may employ modular systems, plywood, wooden boards, concrete panels, etc.

Annex 3 Illustrations

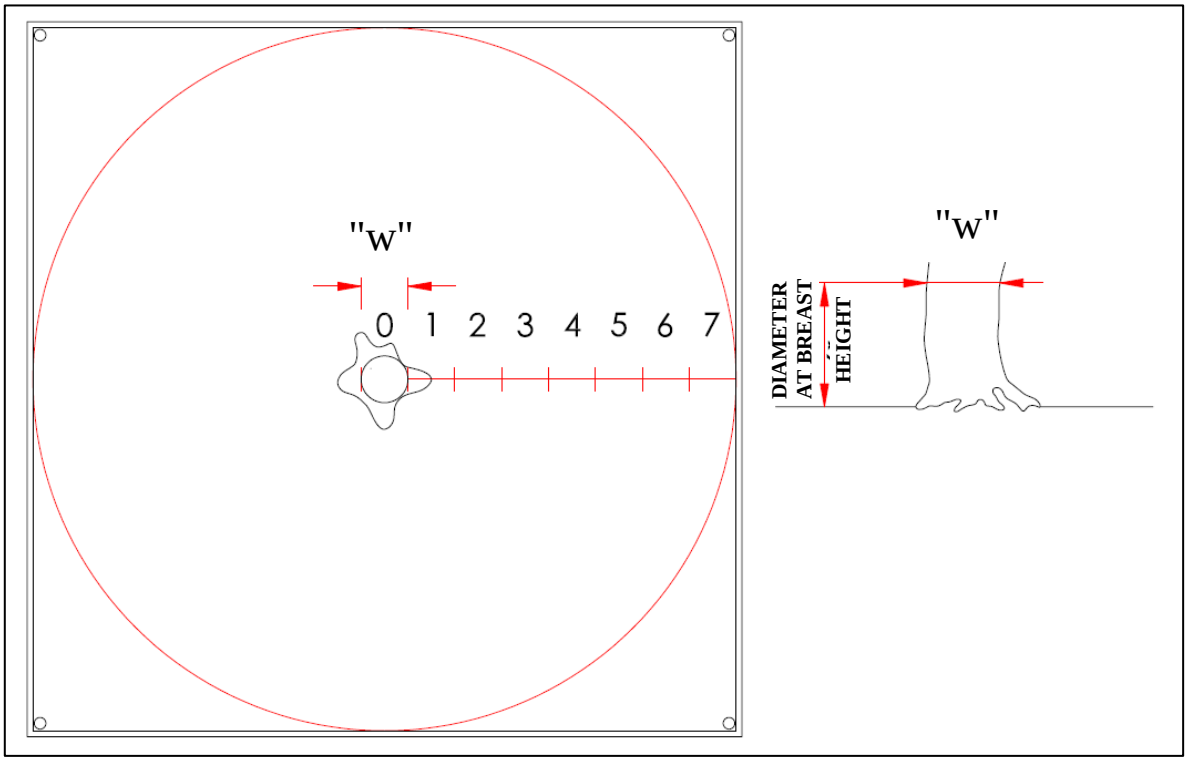

Fig. 1: Delineation of protected root area for category B tree – option 1 (3.1.2)

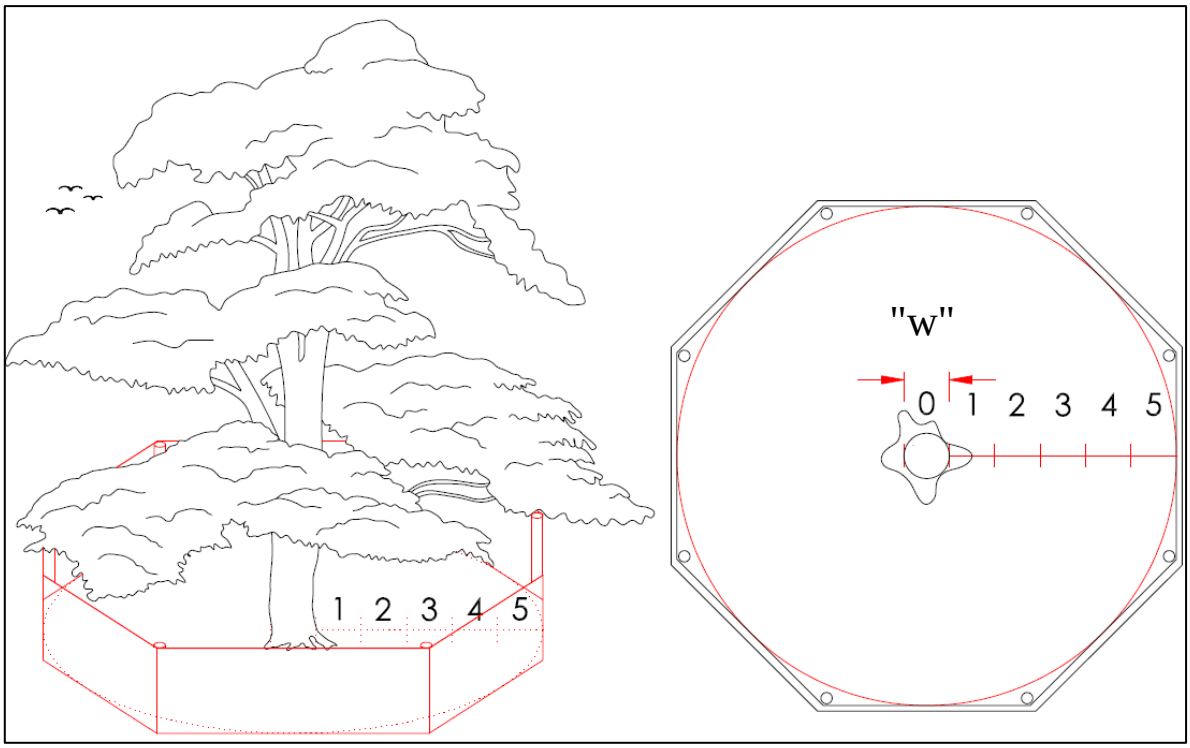

Fig. 2: Delineation of protected root area for category C tree – option 2 (3.1.2)

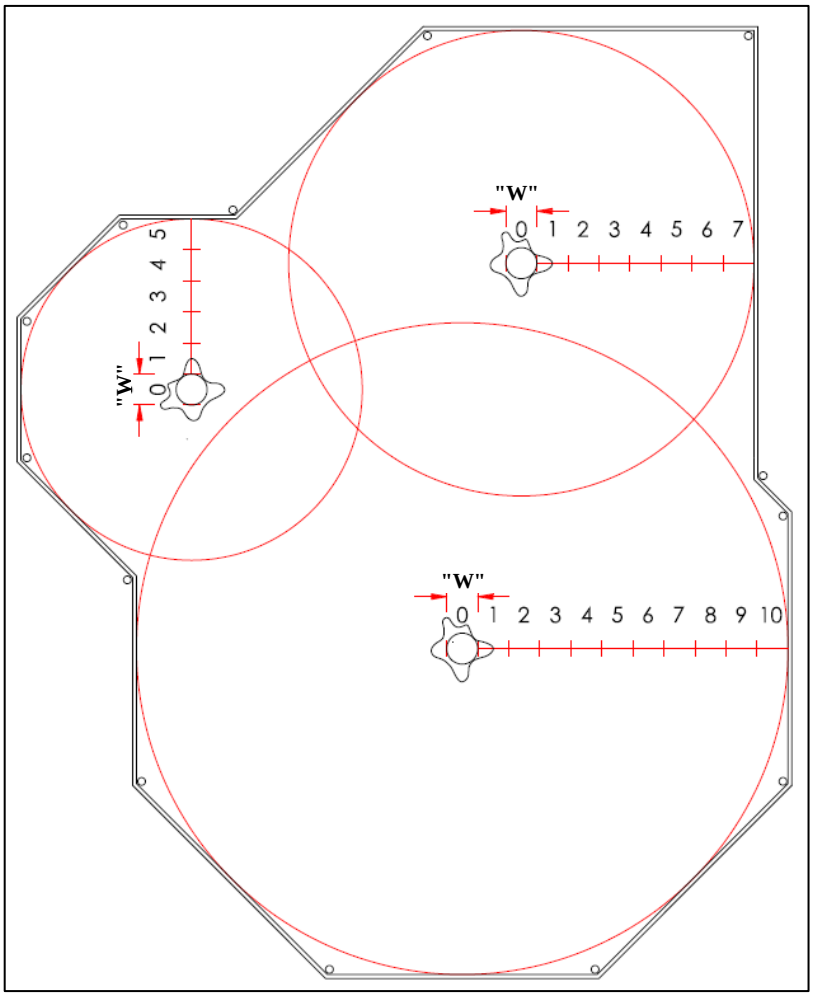

Fig. 3: Delineation of protected root area for trees growing in a group (example of tree in categories A, B and C)

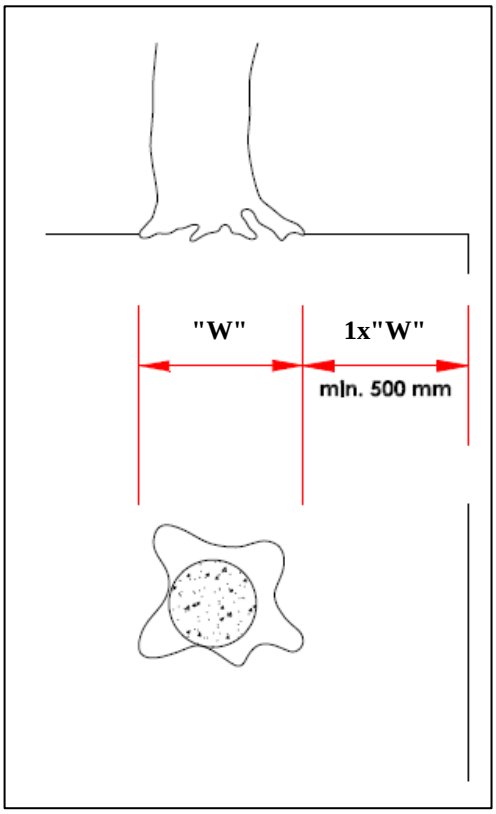

Fig. 4: Size of minimum protected root area in the direction towards the obstacle (3.2.2)

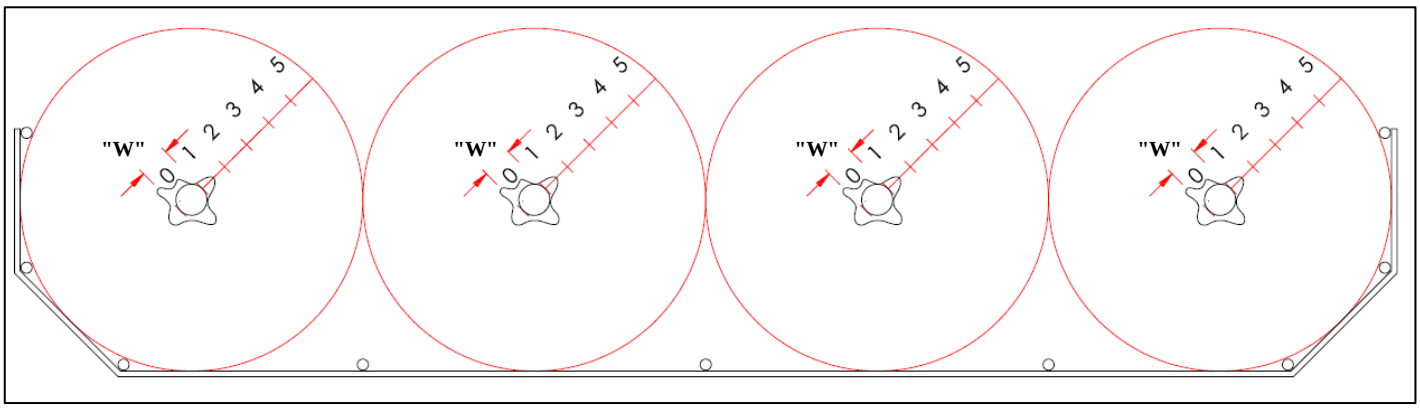

Fig. 5: Delineation of non-enclosed protected root area for category C tree (4.1.4)

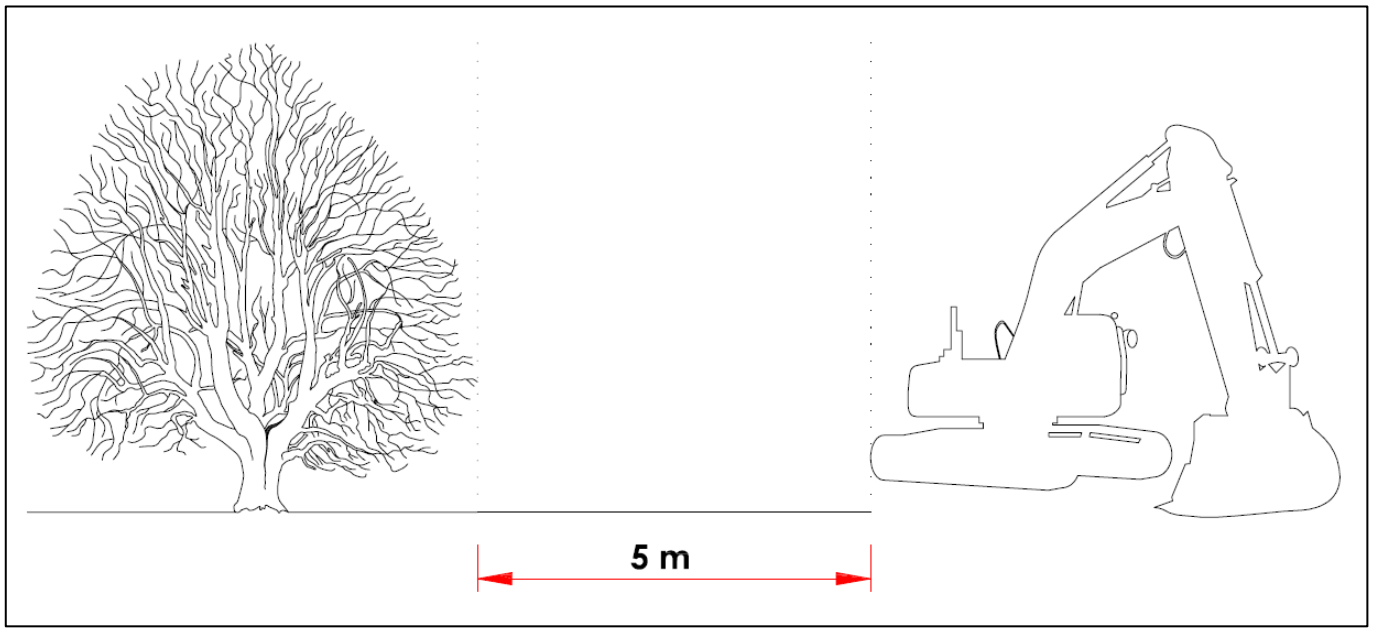

Fig. 6: Minimum distance from sources of heat (3.4.2)

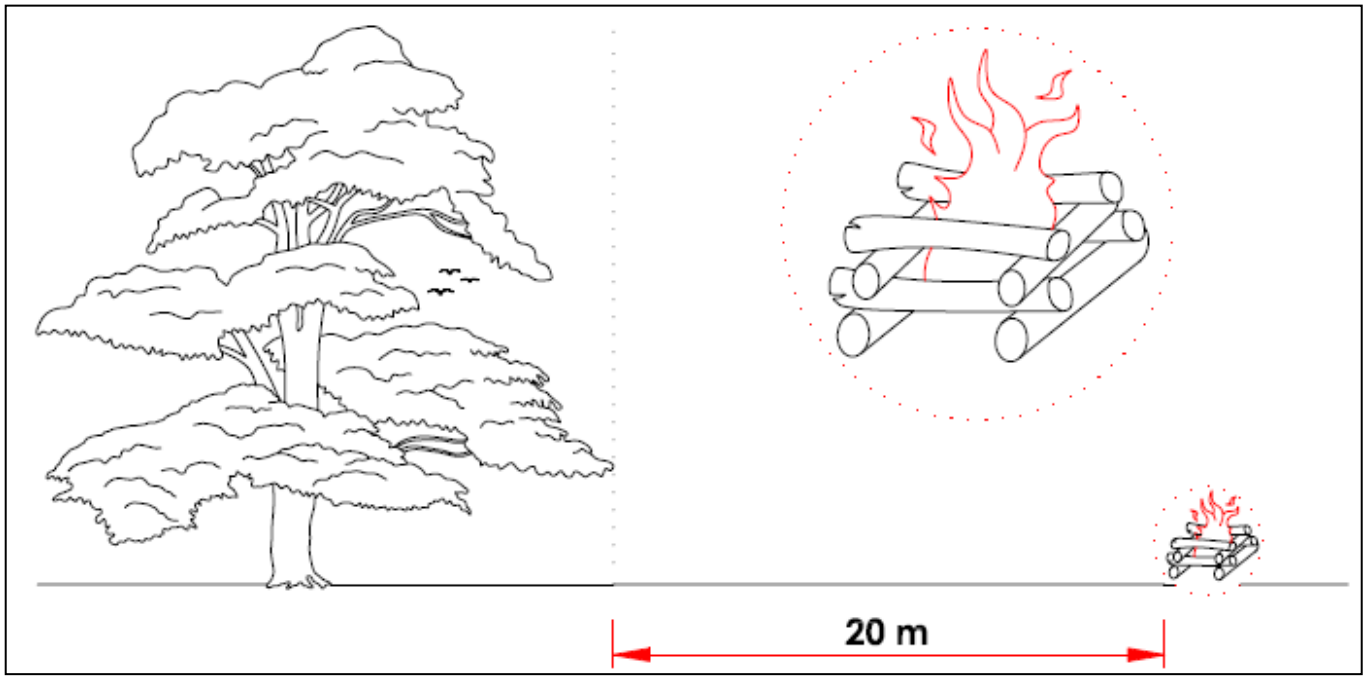

Fig. 7: Minimum distance from open fire (3.4.1)

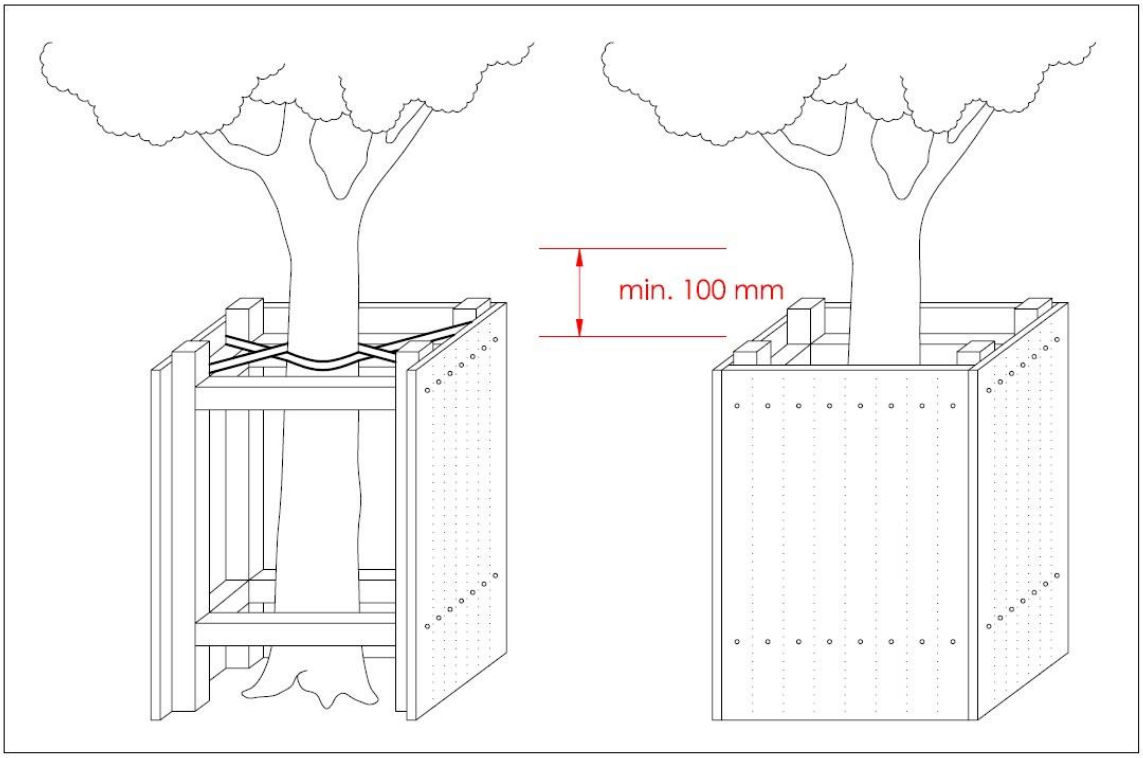

Fig. 8: Trunk protection – model example 1 (4.2.4.1)

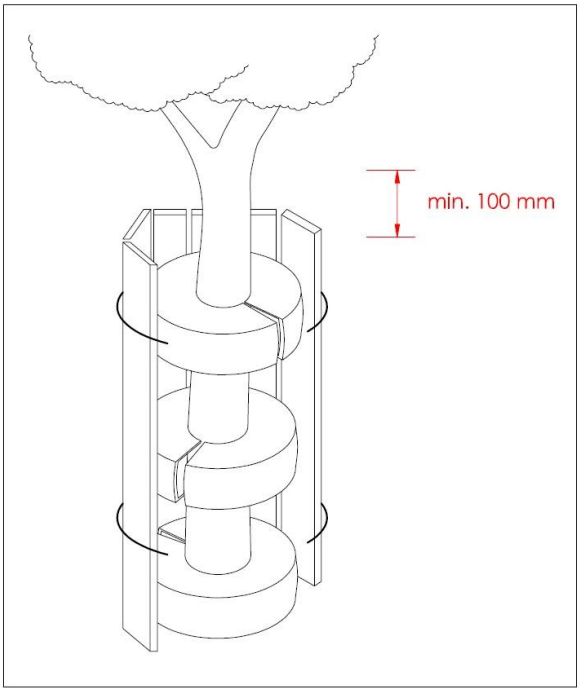

Fig. 9: Trunk protection – model example 2 (4.2.4.2)

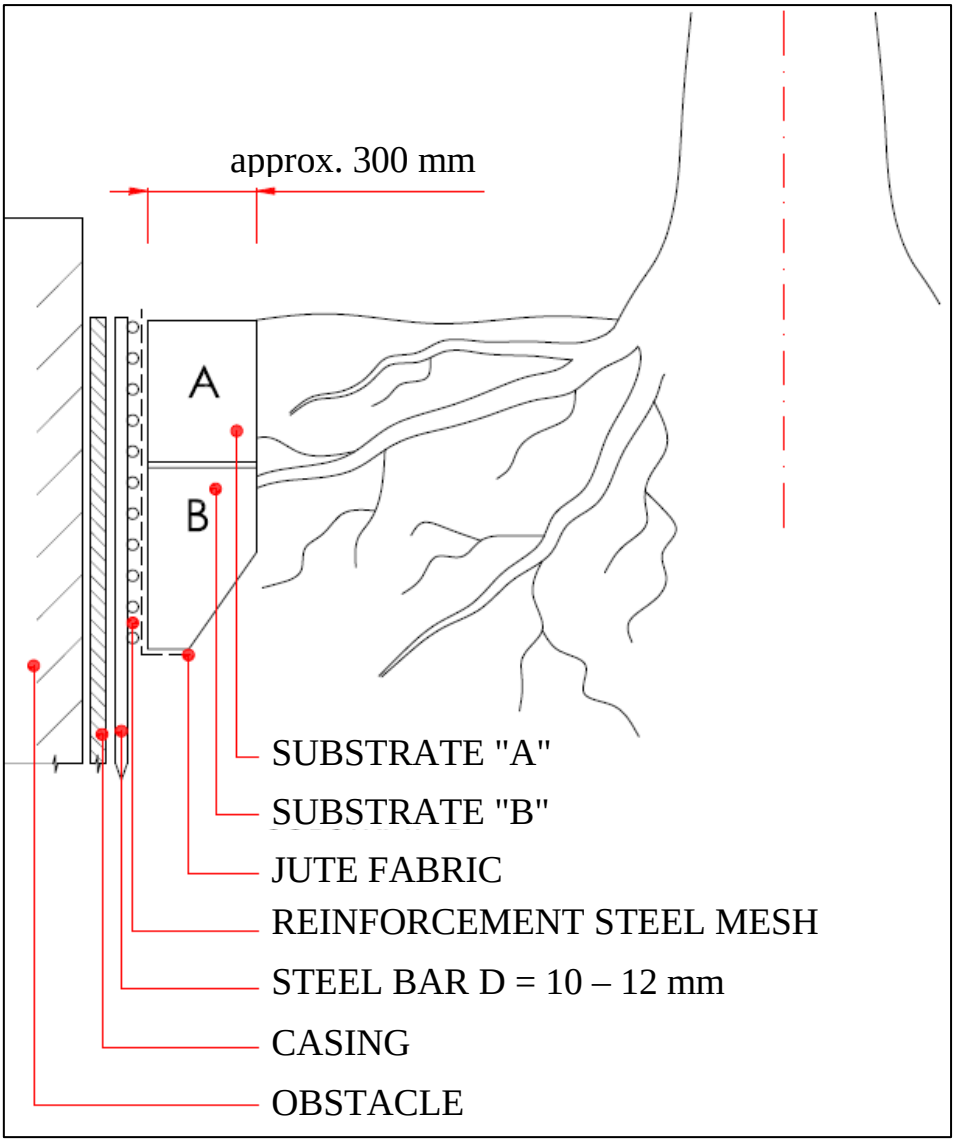

Fig. 10: Model example of root curtain (4.2.2.6)

Annex 4 List of Nature and Landscape Management Standards (Arborist Standards) developed

01 Inspection, assessment, planning

01 001	Assessment of tree condition
01 002	Protection of woody plants during development activities

02 Work procedures

02 001	Planting of trees
02 002	Pruning of trees
02 003	Planting and pruning of shrubs and climbing plants
02 004	Safety bonds and other stabilisation systems
02 005	Cutting of trees
02 006	Protection of trees against lightning strike
02 007	Modification of woody plant site conditions
02 008	Woody plant stand establishment and management
02 009	Special interventions in trees
02 010	Management of woody plants along public transport infrastructures
02 011	Management of woody plants along public technical infrastructures

SPPK 01 002:2017 Protection of woody plants during development activities

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