Discussion on Construction and Maintenance Management Strategies of Landscape Greening in Urban Construction

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Abstract: This paper aims to achieve long-term stability of landscape gardens. By integrating the core aspects of urban greening construction and maintenance management, it analyzes key construction points such as layout optimization based on site conditions, control of planting suitable plants, application of ecological paving, and the combination of garden ornaments with greenery. It also summarizes maintenance strategies including dynamic plant monitoring, periodic scientific pruning, improvement of soil physical and chemical properties, and emergency protection against extreme weather. The study elaborates on the technical pathway for the synergistic advancement of construction and maintenance. The research aims to demonstrate that integrated management, characterized by "construction adapting to site characteristics and maintenance following growth patterns," can effectively enhance the survival rate of garden vegetation and landscape stability. This achieves the integration of ecological functions, landscape effects, and use value, providing practical references for the high-quality construction of urban landscape greening.

1. Introduction

As urbanization is accelerative, landscape greening has become an important carrier in improving human living environment and promoting urban ecological quality. On the other side, it's often quality is limited by the split between construction and maintenance, absence of technical versatility, etc. The construction stage of landscape greening can be referred to as the primary bottleneck phase in determining the ultimate construction effect of landscape, while maintenance management is a long-term efficient preservation type; both need to closely connect and cooperate with each other. According to this, the construction and maintenance management of urban landscape greening is discussed in this paper. It sorts out practical methods from site adaptation, plant control and functional optimization for construction dimension, dynamic monitoring and scientific maintenance for maintenance dimension, putting forward solutions to the problem of "emphasizing appearance over substance, and construction over management" in garden-building.

2. Greening Construction Schemes for Landscape Architecture in Urban Construction

2.1 Optimizing Greening Construction Layout Based on Site Geology and Hydrology

Through stratified Geological Testing that integrates both drilling and in-situ testing, organic matter content, porosity and compacted soil percentage of the 0-1.5m planting layer soil should be detected. At the same time, record the water table depth, seasonal water level fluctuation curves, and soil permeability coefficient and compile them into a geological hydrological distribution map. Strategize different layout strategies for the terrains. Arrange a multi-layered planting area for shrubs and ground cover using interlocking root systems to keep the soil moist and nutrient-rich if the chosen area is sandy and likely to lose its nutrients. For low-lying sites that have shallow groundwater (depth less than 1.2m), first build a blind drain drainage system of gravel material (blind drain spacing is 3–5 m, gravel particle size ranges from 20 to 40 mm), and design the area as wetlands plant zone, so it needs to choose water-resistant plants such as iris and calamus which are unlikely to cause root rot caused by waterlogging [1]. Optimize microtopography with vertical

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design; Planting belts on slopes >15 °; Each planting belt, 2-3m in width and surrounded low concrete retaining wall (height 15–20cm) assisted in erosion control. Use differences in topographic elevation to promote natural rainwater infiltration, and pursue the two objectives of "layout adapting to geology" and "topography regulating hydrology".

2.2 Selecting Suitable Plants and Standardizing Planting Process Control

Create a selection system emphasizing on the basis of "native species + complementary ecological functions". Identify the species of tree to be established as well as companion plants in site micro-environment according to urban climate zoning. You may be trained on ground covers of the right shade-tolerant species like Hosta and Liriope to raise it with and elsewhere highways are heavily polluted, use long-lived trees such as Platycladus orientalis and Broussonetia papyrifera. Physiological characterization of the seedlings, where trunk diameter error ≤5% and root system integrity rate ≥90%, to prevent transmission of pests and diseases that could be transmitted by introducing plants [2]. Method of improving soil for planting: If pH <6.5, use quicklime mixed with 500-800g/m^2 for adjustment; if organic matter content <2%, mix decomposed sheep manure or compost (50% of 1) to increase soil fertility. For root ball size measure trunk diameter first, and make root ball tightly wrap with straw rope when digging seedlings. Dig the planting pit 30-50cm larger than the root ball A pit bottom is working with a 10-15cm thick layer of mixed layer (1:2 crushed straw and decomposed organic fertilizer). After place vertically (deviation 1) the seedling and backfill with layer by layer (the thickness of each layer is 20cm, compaction degree is about 85%-90%) to avoid pulling root as a result of voids. Water thoroughly right after planting and erect triangular support, at support point of 1/2 to 2/3 trunk height, padded with soft rubber pads at contact points. Finally, cover the base of tree trunk with a layer of 5-8cm pine needles or wood chips, it will decrease evaporation and generate weed.

2.3 Using Ecological Paving Technologies to Enhance Landscape Practicality

Choose combined permeability and load bearing materials: use permeable concrete for main garden paths, aggregate using 5-10mm single-grade basalt, cement-permeability agent ratio of 1:0.03 (porosity 15~20%)and the permeability coefficient ≥1.0×10^{-3} m/s; for secondary paths and courtyard areas choose interlocking "checkerboard" pattern bricks with planting hole area ≥40%, fill it with a mixture of planting soil & grass seeds to keep green space but bear pedestrian traffic; Permeable paving base course uses a composite structure of graded crushed stone and permeable asphalt. Base thickness (≥ 20 cm for main paths, ≥ 15 cm full crushed stone layer for secondary paths) is dependent on applied load. Compacting pipe layer by layer during construction with base compaction set to ≥93% in anticipation of future settling [3]. Drainage and maintenance assistance: Install infiltration blind drains every 10–15m parallel to paving edges (30cm wide, 40cm deep, filled with gravel wrapped in a geotextile) that direct infiltrated rainwater into the municipal storm water network. Timed Maintenance of Permeable Paving and Grassed PavementOne, keep pores clean: use pressure water jet to wash interstitial pore (pressure 2-3MPa) once every three months; regularly refill sealant on the permeable concrete top surface: overall dosage is also about 0.2kg / m²;Three, timely trim vegetation growing in grass paver area:Getting cut twice a year This helps keep the paving permeable and long-lasting.

2.4 Refining Construction Details for the Integration of Garden Ornaments and Greenery

Prioritize, as always, the hardscape first softscape second principle for which to coordinate the sequence of ornament foundation construction and planting activities. At the first stage, you finish the complete foundations construction for your hardscape ornaments; and it is enough to dig only a little bit deep or 10cm of foundation excavation gives you a strong base when filling with C20 cement in ground flaked up concrete block with embedded Φ12 rebars to help that foundation expressing its weight through stability. After the concrete has set for 7 days, install the ornament body. Only build softscape ornaments once neighbouring plants are already in place, as digging can damage roots. For instance, you are trained to plant low ground cover plants within a radius 1.5-2 times the diameter of small ornaments because having lots of green around point ornaments creates

for our perception what is known as "point (ornament) and surface (greenery)" hierarchy. On each side of medium ornaments, plant medium shrubs so the ratio of shrub crown width to ornament's width is 1:1.2 at the maximum to avoid obscuring the ornament. Stay ≥2m from foundation for large ornaments, plant tall trees Take advantage of the change in height between tree canopies and the tops if ornaments, suggests creating comfortable spaces with shade above and seating below [4]. A 5-10cm gravel strip of isolation is installed between any mortared component of the garden and smaller items, to minimize root infiltration. Paint preservative oil on the surface of wooden ornaments and use a 10-15cm ventilation gap under the base of the wooden structure to reduce moisture erosion from rain. In the case of hanging planter boxes with cascading plants, add drainage holes at the bottom, installing drip trays underneath to prevent water from polluting ground and maintaining long-term aesthetic unityA close connection between ornaments and plants while maintaining functionality.

3. Maintenance Management Strategies for Urban Landscape Architecture

3.1 Establishing a Dynamic Monitoring Mechanism for Plant Growth Status

Build a layered monitoring system. Monitor growth of above ground plants, including leaf health, branch growth, flowering and fruiting. Use of root monitoring tubes to observe root distribution and vitality in the ground every so often; soil tensiometers to monitor registered soil moisture amount in the foundation depth (0-60cm); respectively, sandy dirt moisture content 12 18%, glutenous dust humidity varity: 18% 25%. Simultaneously monitor the ambient conditions every 3 months, such as air humidity, light intensity, soil pH and nutrient content [5]. In order to facilitate collective sharing, create a monitoring data ledger in accordance with the "one plant and one file" model, record each set of monitoring data, draw growth curves and make comparative analysis using Excel or maintenance management software. Once an indicator is abnormal in two consecutive readings, immediately start the analysis behind the cause and targeted corrective measures, to achieve closed-loop "monitoring-analysis-correction-feedback" management. Deploy smart monitoring devices on critical plants and feed real time data back to a management platform with automatic alarms for outliers, effectively improving the timeliness and accuracy of monitoring.

3.2 Implementing Scientific Pruning Maintenance According to Plant Growth Cycles

Identify pruning cycles and identify key goals The construction principle of deciduous trees is "heavy pruning during dormancy, light pruning during growth." In dormancy, thin dense, diseased, insect-infested and crossing branches but limit pruning amount to 15-20% of total crown volume while modifying tree form. It is suggested to remove the water sprout and drooping branches (water shoots and drooping branches affected by pests) in the growth period (April-October), with pruning not exceeding 5% [6]. Yes, you can prune evergreen trees using "thinning as the main method, light pruning and slow release" once early March and early September respectively. Decide how to thin, and keep the crown ventilated throughout by not allowing inner branches to grow closer than 30cm apart for light penetration; Avoid excessive use of heading cuts because they will encourage too many weak buds. Pruning ornamental shrubs for flowering and foliage 10–15 days after your shrubs have finished flowering, remove flower branches that have fruited but leave healthy buds and make cuts 1–2cm above the bud. Also, head back aging branches. While foliage shrubs are trimmed, do so once in March and July with shearing or shaping to keep neat. Promptly clean and collect pruned branches and leaves so they do not become a refuge for pathogens. Standardize pruning operational details. Disinfect tools beforehand with 75% alcohol to avoid cross-contamination. As for cut with thorn; you have to apply "three-cut method" on each branches from top 1/3 undercut then take the second top cut and lastly cut stub but make sure that your stump height is less than 5cm so that the bark won't be ripped off. For wounds greater than 2cm in diameter, apply tree wound dressing to facilitate healing [7]. Post-pruning care to be strengthened: water once in 3 days after deep drainage and short irrigation, with light fertilization. If any abnormalities detected in healing barnis, we have to apply dressing and disinfection.

3.3 Regularly Improving Soil Physical and Chemical Properties to Ensure Vegetation Survival

Test cycles and indicators: Conduct full soil tests in every Spring (march-april) and Fall (Sept-October), utilising it with "five point sampling technique". Soil samples were collected from different points at different layers. pH, organic matter (of at least 3%) as well as bulk density, porosity and salt content are among the test indicators [8]. Develop differentiated improvement plans. For acid soil, after clime (pH <6.0), top dressing 500~800g/m², each time according to the test pH once every 6 months from low-to-high range of continuous adjustment. For saline-alkali soil, carry out the "salt drainage + improvement", that is: first to excavate ditches with a depth of 60cm and a width of 40cm for solidification drainage, second applying desulfurized gypsum with an amount of 3-5kg/m² to reduce alkalinity. In compacted soil, make mechanical loosening; add 10–15kg of decomposed straw or sawdust m² to increase porosity. For soil with organic matter less than 2%, apply decomposed organic fertilizer using the "ring trench method" each spring and autumn: first open a ring trench of 30cm×20cm width and depth at the canopy drip line, mix the organic fertilizer with topsoil before backfilling to avoid contact between roots and fresh decomposition, which may burn roots[9]. Water well within 15 days of improvement to mix the amendments with the soil. Regularly, loosen soil to confirm that you don´t allow re-compact. 5-8cm of mulch (wood chips pieces would generally be considered as einige) or bark-mulching the extent root on has proved affective remove removal evaporation and but allows organic matter from die back to and features management a "improvement-maintain-continuous restructuring" with soil.

4. Conclusion

This study provides a summary of the construction and maintenance management of urban landscape greening, and gives the conclusions as follows: It is necessary to follow "Adaptability" in all aspects of construction. It constructs a site-specific, functionally coordinated construction system that solidifies the basis for stable garden operation. It looks like "dynamism" to carry out the maintenance, the formation of "demand-based regulation, continuous optimization" maintenance model, through plant monitoring, routine pruning, soil improvement and major weather protection measures. The vital synergistic connection of construction and maintenance is that construction enables maintenance while operational data coming from maintenance actually feeds back into enhancing the efficiency during the execution of actual construction. The combination provides a unity of ecological, aesthetic and practical values in landscaping that resolves the problem of "post-construction management difficulties".

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