Landscape Architecture Program (LAP) Research Program Strategic Plan and Gap Analysis

Purpose: The strategic research plan is a tool that articulates the role of research and its value in the LAP. It is a dynamic document that can be updated and changed as research needs evolve. By highlighting research priorities and identifying research gaps, the plan promotes an efficient and effective research process.

Caltrans
Mission: Provide a safe, sustainable, integrated and efficient transportation system to enhance California’s economy and livability.

LAP Research Program
Purpose: Advance landscape architectural practice and knowledge by researching and implementing state-of-the-art technologies and methodologies that balance mobility, safety, and maintainability with economic needs, adjacent land use and aesthetic, environmental, scenic and community values.

- **Sustainability**
  Goal: Develop standards and guidelines that improve the cost, efficiency and safety of ecologically-based sustainable roadside management practices

- **Livability**
  Goal: Promote excellence in multi-modal transportation design that improves safety, mobility, economics and maintenance

- **Landscape Design**
  Goal: Promote environmental stewardship of the natural and constructed roadside

- **Context Sensitive Solutions**
  Goal: Protect & enhance the through a collaborative approach involving all stakeholders

- **Highway Planting**
  Goal: Improve planting & vegetation success

- **Irrigation**
  Goal: Conserve water & reduce irrigation life-cycle costs

- **Aesthetic Values**
  Goal: Protect & improve aesthetic values visible from & to transportation facilities

- **Landscape Construction**
  Goal: Improve landscape construction methods

- **Safety**
  Goal: Improve traveler & worker safety through design

- **Erosion Control & Storm Water Pollution Prevention**
  Goal: Protect roadsides and improve storm water quality

- **Climate Change**
  Goal: Develop adaptation strategies to reduce the impacts of climate change

- **Soils**
  Goal: Protect and improve soil resources

- **Weed & Pest Control**
  Goal: Develop integrated best practices to prevent and control invasive & noxious species

- **Sustainability**
  Goal: Develop standards and guidelines that improve the cost, efficiency and safety of ecologically-based sustainable roadside management practices
## Sustainability

### LAP Research Projects

#### Erosion Control & Stormwater Pollution Prevention

**Goal:** Protect roadsides & improve storm water quality

<table>
<thead>
<tr>
<th>Objective</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 5, 6</td>
<td>ID different types &amp; methods of rain water harvesting (micro basins, cisterns, landscape grading, etc)</td>
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<tr>
<td>1, 2, 3, 5, 6</td>
<td>ID how to monitor water quality &amp; usage of rain water harvesting methods to meet water conservation needs, improve revegetation &amp; improve groundwater recharge (Part 2)</td>
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<tr>
<td>2, 3, 6</td>
<td>Impacts or value of leaf litter from trees on water quality &amp; storm water treatment BMP performance</td>
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<tr>
<td>1, 2, 3, 4, 6</td>
<td>ID best practices &amp; strategies in effective soil stabilization, post fire remedies along state right-of-way</td>
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#### Climate Change

**Goal:** Develop adaptation strategies to reduce the impacts of climate change

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<tr>
<td>1, 2</td>
<td>Best practices in determining &amp; developing methods to ID &amp; track carbon sequestration credits from roadside vegetation</td>
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<tr>
<td>1, 2</td>
<td>ID, locate &amp; implement alternative fueling stations (electric or battery charging stations) for public use</td>
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#### Weed & Pest Control

**Goal:** Develop integrated best practices to prevent & control invasive & noxious species

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<tr>
<td>3, 4, 5, 6, 8</td>
<td>ID risk &amp; correlation between increased pests issues related to trees &amp; shrubs &amp; drought or water conservation practices to maximize plant health while reducing water usage</td>
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<tr>
<td>1, 2, 3, 6, 7</td>
<td>Review &amp; develop improved strategies for roadside vegetation control by Design of permanent vegetation control treatments along the 'fire strip'</td>
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<td>1, 2, 3, 6, 7</td>
<td>ID effective sealant types for concrete and asphalt cracking to prevent weed growth to reduce pesticide used along the state highway</td>
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**Livability**

### LAP Research Projects

#### Context Sensitive Solutions

**Goal:** Protect & enhance the environment & quality of life through a collaborative approach involving all stakeholders

**Objectives**
1. Develop non-motorized transportation expertise
2. Improve connectivity of bike/ped infrastructure
3. Comply with ADA requirements
4. Facilitate relationship building with internal & external stakeholders
5. Prevent project delays, re-design & cost over-runs
6. Quantify economic benefits to communities
7. Develop design flexibility guidance
8. Implement corridor master plans
9. Quantify economic value of pollution removal services provided by landscaping

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<td>1, 2, 3</td>
<td>Lessons learned by other DOTS on their statewide aesthetic corridor master plan. Is it an effective planning tool, how were they funded, and how were guidelines developed</td>
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#### Aesthetics

**Goal:** Protect & improve aesthetic values visible from and to transportation facilities

**Objectives**
1. Improve appearance & safety of roadside appurtenances
2. Protect scenic quality of transportation corridors
3. Quantify the value of aesthetics

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#### Safety

**Goal:** Improve traveler & worker safety through design

**Objectives**
1. Reduce maintenance worker exposure to motorized traffic
2. Reduce conflicts with vehicles & roadside appurtenance
3. Minimize fire hazards
4. Improve security at Safety Roadside Rest Area
5. Improve traveler stopping opportunities

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<tr>
<td>1, 5</td>
<td>Review Federal, Departmental &amp; other policies or mandates to determine and identify the types of wildlife that cross Caltrans right of way, percent killed each year (Part I)</td>
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<tr>
<td></td>
<td>Review other DOTs wildlife passage policies, guidelines, funding sources, and design standards (based on type of wildlife that crosses Caltrans right of way) as part of highway projects (Part II)</td>
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#### Objectives

1. Develop non-motorized transportation expertise
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**Goal:**
- Protect & enhance the environment & quality of life through a collaborative approach involving all stakeholders

**Goal:**
- Improve traveler & worker safety through design

**Goal:**
- Protect & improve aesthetic values visible from and to transportation facilities
LAP Research Projects

Highway Planting
Goal: Improve planting & revegetation success

Objectives
1. Establish desirable vegetation in the R/W
2. Comply with permit requirement for revegetation & mitigation
3. Develop sustainable landscapes

Irrigation
Goal: Conserve water & reduce irrigation life-cycle costs

Objectives
1. Reduce maintenance of irrigation systems
2. Reduce need for supplemental irrigation
3. Improve irrigation efficiency & reliability
4. Reduce irrigation construction costs

Landscape Construction
Goal: Improve landscape construction methods & reduce construction costs

Objectives
1. Improve cost estimating practices
2. Reduce contract change orders
3. Incorporate recycled products
4. Reduce construction worker exposure to traffic
5. Insure timely project completion
6. Increase bidder interest in projects

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<td>1,2,3</td>
<td>Identify, prioritize, and document electronically, high water landscape areas (acres, location) statewide to be converted to low water conservation planting and irrigation for water savings, programming and determine SHOPP needs</td>
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<td>1,2,3,4</td>
<td>Current state of the practice for merging aerial and mobile LiDAR data sets together in a single searchable database (GIS) for inventory of all landscape elements along state right of way</td>
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RESEARCH PROCESS AND FUNDING CYCLE

National Cooperative Highway Research Program (NCHRP)
- May: Formal request to others for new research proposals or evaluate existing research and rank priority
- July: Prepare new NCHRP project problem statements for funding consideration in next FY (Use NCHRP Problem Statement Outline format)
- August: Work with executive management and DRISI on proposals
- September: Share proposals with NCHRP committee and TRB panel committee to gather support on research topics and proposals
- October 15: Submittals due.
- March: NCHRP announces problem statements selected for next FY

American Association of State Highway Transportation Officials (AASHTO)
- May: Formal request to others for new research proposals or evaluate existing research and rank priority
- July: Prepare new AASHTO domestic Scan proposal for funding consideration in next FY (Use AAHSTO Domestic Scan proposal format)
- August: Work with executive management and DRISI on proposals
- September: Share proposals with Standing Committee on Design (SCOD) to gather support on research topics and proposals
- October 15: Submittals due no later than the 15th. Submit online at: http://web.transportation.org/nchrp/20-68A/Submit.aspx

Division of Research, Innovation, and System Innovation (DRISI)
- April: Formal request to TAP for new research proposals or evaluate existing research and rank priority
- May: Share proposals with HQ Staff & gain support for proposals & rank¶
- July: Coordinate with DRISI and executive management in maintaining and updating the Design/Construction Preliminary Investigation (PI) Check List
- July: Coordinate with TAP on updates or new research PI topic proposals
- Quarterly: Provide updates or new proposals to DRISI at the quarterly task review meeting
- Ongoing: Write up and submit a detailed PI once approved by TAP, DRISI and Division of Design
- Per queue: PI contract awarded to consultant

Information can be found at:
http://www.dot.ca.gov/newtech/researchreports/preliminary_investigations/index.htm