Ohio Department of Transportation
Aesthetic Design Guidelines

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The environmental review, consultation, and other actions required by applicable federal environmental laws for these projects are being, or have been, carried out by ODOT pursuant to 23 U.S.C. 327 and a memorandum of understanding dated December 11, 2015, and executed by FHWA and ODOT.
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CHAPTER 1: INTRODUCTION

ODOT’s *Aesthetic Design Initiative* was created to improve the aesthetic appearance or “visual appeal” of our transportation facilities. The citizens of Ohio deserve an aesthetically pleasing transportation system, as well as one that is safe, efficient, and cost effective. Considering safety, operational efficiency, cost, environmental impacts, and aesthetics is the foundation that ODOT uses in decision-making on every project.

**ODOT considers aesthetics to be inherent to the development of transportation projects and encourages consideration of aesthetics on every project. However, the degree to which aesthetics are implemented is determined on a project-by-project basis throughout ODOT’s Project Development Process (PDP).**

The use of aesthetic treatments can make a project’s appearance more attractive and compatible with local surroundings, often at little additional cost. The guidelines in this manual are intended to provide direction, education, and support to all who contribute to Ohio’s transportation system. These contributors include ODOT employees, consultants, contractors, elected officials, Local Public Agencies (LPA’s), and the public. The goals of this manual are as follows:

- Describe how aesthetic design is incorporated into ODOT projects throughout the PDP.
- Provide guidance on aesthetic design principles and applications.
- Establish consistency with other ODOT manuals and guidance documents.

Chapter 2 and Chapter 3 of this document summarize ODOT’s PDP, describe how aesthetics fits within the PDP framework, and outline how aesthetics are incorporated into ODOT projects (including LPA projects and Permit projects with ODOT involvement). Chapter 4 describes fundamental aesthetic principles for roadway projects and Chapter 5 provides guidelines and recommendations for designers and stakeholders to consider when incorporating aesthetic treatments on ODOT projects. Chapter 6 presents several case studies showing how aesthetics have been applied on ODOT projects. Appendix A includes checklists and forms for documenting the aesthetic design process within various phases of the PDP. Appendix B provides a summary of ODOT’s baseline aesthetic treatments. Appendix C provides a supplemental library of aesthetic design reference documents from Ohio and other states (website hyperlinks).
CHAPTER 2: AESTHETICS AT ODOT

2.1 AESTHETICS IN ODOT MANUALS

Within ODOT’s array of environmental, design, and construction manuals and guidance documents, references to aesthetics are occasionally presented for consideration. With this guidance, ODOT is attempting to place a greater emphasis on design aesthetics. ODOT requires that the Project Development Process (PDP) be used to incorporate aesthetic design into ODOT projects, and that aesthetic treatments must meet standard engineering, safety, and functional requirements. Most references aesthetic design can be found within ODOT’s Bridge Design Manual (BDM), Location and Design Manual (L&D) Volume 1, and Traffic Engineering Manual (TEM) since these manuals address the primary design elements in a transportation corridor relevant to aesthetics (bridges, retaining walls, noise barriers, traffic signals, lighting, signs, and landscaping). Other ODOT manuals and guidance documents that have been developed in conjunction with the PDP Manual also directly (or indirectly) reference aesthetics. These manuals typically address projects that result in the use of specific treatments designed to restore or enhance aesthetics along a transportation facility or an affected environmental resource. Primary examples include:

- **Public Involvement**: The National Environmental Policy Act (NEPA) requires ODOT, in partnership with the Federal Highway Administration (FHWA), to create an interdisciplinary approach to project planning and development, and decision-making. This approach not only requires that ODOT assess and determine if a project will result in significant environmental impacts, but also requires input be solicited from stakeholders, including (but not limited to) local agencies, elected officials, and the general public. This will assist in the gathering of information to help reduce or alleviate potential direct, indirect, and cumulative impacts. Stakeholder/public involvement is a critical component of ODOT’s PDP, and consideration of aesthetics is an important aspect of ODOT’s public involvement process. Many aesthetic treatments constructed as part of ODOT projects are agreed upon and developed through stakeholder/public involvement. ODOT’s Public Involvement Manual and Design Aesthetics Public Involvement Update provide additional details and guidance.

- **Cultural Resources**: Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of their actions on historic properties. The Section 106 process seeks to incorporate historic preservation principles into project planning through consultation between ODOT and the State Historic Preservation Office (SHPO), and other parties with an interest in the effects a project might have upon historic properties. If it is determined that a project will have an adverse effect upon historic properties, ODOT evaluates measures to mitigate the adverse effect in conjunction with the SHPO and Section 106 Consulting Parties. Mitigation measures developed through the consultation process may include aesthetic treatments, to be carried through as environmental commitments which must be completed and accounted for by ODOT and SHPO. In some circumstances, ODOT will also incorporate aesthetic treatments into a project design to avoid an adverse effect or to make the project more compatible with the style of a historic property or district. ODOT’s Cultural Resources Manual provides additional details and guidance.
Highway Traffic Noise: Many ODOT projects require detailed noise analyses during the project development process in accordance with Title 23 Code of Federal Regulations Part 772, FHWA’s Highway Traffic Noise Analysis and Abatement Guidance, and ODOT’s Highway Traffic Noise Manual. Once final studies are complete, public involvement activities are conducted if noise impacts are anticipated and abatement is considered feasible and reasonable in accordance with ODOT’s noise policy. Through this public involvement process, affected property owners are afforded the opportunity to approve (or reject) construction of structural noise abatement, and provide input on noise barrier aesthetic treatments (including material type, textures, and color). These treatments are carried through as environmental commitments which are then completed and accounted for by ODOT. Through the public involvement process, ODOT will also work with local stakeholders when special aesthetic enhancements are desired on a noise barrier (or a retaining wall or a bridge), such as a special color or texture, or a jurisdiction’s name or logo.

Section 4(f): Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966 protects publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public or privately-owned historic sites from adverse impacts resulting from the construction of transportation facilities funded by the USDOT. Similar to the cultural resources (Section 106) process, if it is determined that a project will have an adverse impact upon Section 4(f) resources, ODOT must develop measures to minimize and/or mitigate harm. Mitigation measures developed through the Section 4(f) process may include aesthetic treatments to be carried through as environmental commitments which must be completed and accounted for by ODOT. ODOT’s Section 4(f) Manual provides additional details and guidance.

Scenic Rivers: Ohio has hundreds of miles of streams and rivers with exceptional natural, scenic, and/or recreational values that are formally designated as State and/or National Scenic Rivers. Ohio law (ORC 1547.82) requires agency review and approval of ODOT projects within 1,000 feet of a State Scenic River. Federal law (Wild and Scenic Rivers Act) contains stringent rules for review and approval of projects that are federally funded or require federal assistance (approvals, permits) and occur within the bed, banks, or tributary of a designated river. In some instances, Section 4(f) can also apply to these resources. State and federal agency review of ODOT projects in scenic river corridors can trigger a wide range of environmental commitments, including aesthetic treatments. ODOT’s Scenic River Memorandum of Agreement (MOA) with ODNR provides additional details and guidance with respect to ODOT projects and Ohio’s State Scenic Rivers.

Traditionally Underserved Populations: ODOT has developed Underserved Populations Guidance to ensure compliance with Executive Order 12898 (Environmental Justice), Title VI of the Civil Rights Act of 1964, and other related laws, regulations, executive orders, and requirements. This guidance also ensures that ODOT considers traditionally underserved populations within the PDP. Avoidance, minimization, and/or mitigation is required if disproportionately high and adverse effects will occur to an environmental justice population, if disparate impacts will occur to a Title VI population, or if negative impacts (temporary or permanent) occur on any other traditionally underserved population. Minimization or mitigation of impacts to traditionally underserved populations may include aesthetic treatments such as landscaping or construction/rehabilitation of structural elements that incorporate special aesthetic designs. Aesthetic treatments to be implemented are determined through consultation with members of the impacted community.
As stated earlier, one of the key goals for ODOT’s Aesthetic Design Guidelines is to establish consistency among the other ODOT manuals and guidance documents with respect to aesthetic design. ODOT intends for this document to provide the basic aesthetic process and guidelines which other ODOT manuals will reference and compliment, providing project teams with tools and information for incorporating aesthetics into ODOT projects. Though basic aesthetic principles are unlikely to drastically change over the long-term, ODOT frequently updates the PDP Manual, design manuals, and environmental guidance manuals as laws, policies, and best practices change over time. Consequently, future updates to other ODOT manuals and guidance documents may prompt occasional updates to this Aesthetic Design Guidance document. Likewise, as new ODOT projects are designed and constructed, new case studies and aesthetic treatment options could prompt new guidelines to be incorporated into this guidance document, as well as updates to other ODOT manuals.

### 2.2 OVERVIEW OF BASELINE AND ENHANCED TREATMENTS

There are two ways aesthetic design is incorporated into ODOT projects. The first is through implementation of standard ODOT engineering and construction specifications as outlined in ODOT’s library of design manuals, including (but not limited to) the Location and Design Manual (L&DM), the Bridge Design Manual (BDM), the Traffic Engineering Manual (TEM), and ODOT’s Construction and Materials Specifications (CMS). These standard aesthetic treatments are referred to as **Baseline Treatments**. The second way aesthetic design is incorporated into ODOT projects is through stakeholder/public involvement or environmental commitments made by ODOT as a project is developed through the PDP. These are referred to as **Enhanced Treatments** (or **Aesthetic Enhancements**) and are implemented in addition to (or in place of) baseline treatments.

Consistent application of ODOT’s standard baseline treatments, combined with well-planned and coordinated aesthetic enhancements, will over time result in a transportation network with a signature look that is uniquely “Ohio”. Much of ODOT’s current highway network is located in a rural setting, and most ODOT construction and maintenance projects occur within its operational right-of-way. Due to these two factors, most ODOT projects will be aesthetically defined by standard baseline treatments, as opposed to stakeholder-driven or commitment-driven aesthetic enhancements. Though most of ODOT’s standard baseline treatments are geared toward establishing the aesthetic “background”, they are crucial to creating cohesive, uncluttered, and visually appealing transportation corridors. Conversely, aesthetic enhancements are typically utilized in higher-profile urban corridors, gateway corridors, and suburban interchanges, and are often designed to address specific public or environmental issues or to add bold, eye-catching, and memorable aesthetic elements to the corridor. By nature, aesthetic enhancements can be expensive, and therefore must be implemented in a manner that fits the surrounding landscape, are consistent with baseline treatments implemented elsewhere along the transportation corridor and are compatible with ODOT’s guidelines for funding and maintaining aesthetic enhancements (see Sections 2.2.2 through 2.2.4).
Chapter 3 outlines the process ODOT uses for incorporating baseline and enhanced aesthetic treatments into ODOT projects within the PDP. This process also applies to local projects with ODOT involvement, including ODOT-Let Local Public Agency (LPA) projects, Local-Let LPA projects, and Permit projects. An LPA is defined as any other State agency, local political subdivision, board, commission, or other governmental entity determined (under Ohio Revised Code) to be qualified to assume the administrative responsibilities for ODOT improvements projects. Below is a summary of when and how baseline treatments and enhanced treatments are utilized in ODOT's design process.

- **Exempt Projects:** Routine construction and maintenance projects that provide little or no opportunity for incorporating aesthetic treatments or substantially improving aesthetics in a transportation corridor do not require specific consideration of aesthetic treatments (see also Section 3.1.2 of Chapter 3). Appropriate documentation will be prepared by the design team during the Planning Phase of the PDP (see Section 3.2 for additional details).

- **Baseline Treatment Projects:** Use of baseline aesthetic treatments is typically appropriate for non-exempt ODOT projects when: 1) no previously-established aesthetic theme exists within or adjacent to a project area, 2) no special aesthetic treatments were agreed upon as a result of stakeholder/public involvement, and 3) the project requires no environmental commitments related to aesthetics. For these projects, appropriate baseline aesthetic treatments are incorporated into the project plans per applicable design manuals. Documentation of baseline aesthetic treatments incorporated into these projects is prepared by the design team during the appropriate plan development stages in accordance with procedures outlined in Section 3.2.

- **Enhanced Treatment Projects:** Enhanced aesthetic treatments are typically appropriate for non-exempt ODOT projects when: 1) there is a previously-established aesthetic theme within or adjacent to a project area, 2) special aesthetic treatments are agreed upon as a result of stakeholder/public involvement, 3) the project requires environmental commitments involving aesthetics, and/or 4) the project’s aesthetic treatments are being sponsored by others, such as an LPA, and enhancements are desired. Once ODOT determines that enhanced aesthetic treatments will be incorporated into a project, development and analysis of appropriate treatment options will be conducted by the design team during the Preliminary Engineering Phase of the PDP. Coordination may be required with ODOT’s Aesthetics Committee to determine the type and overall use of aesthetics on a given project. Approved treatments are then finalized during the Environmental Engineering and Final Engineering/Right-of-Way Phases. Documentation of enhanced aesthetic treatments is prepared by the design team in accordance with procedures outlined in Section 3.2.

### 2.2.2 ODOT Funding Guidelines

Cost is a significant issue with respect to aesthetic treatments. Though ODOT desires to provide an aesthetically pleasing transportation system for Ohio’s citizens, project budgets are limited and ODOT’s construction and maintenance needs are extensive. Aesthetic treatments must be
implemented in a cost-effective manner, balanced against other critical transportation issues (such as safety, operational efficiency, and environmental impacts), and must not be overly difficult or costly to maintain.

**Baseline Treatments:** As noted in Section 2.2.1, baseline aesthetic treatments are included in applicable ODOT design manuals for implementation across a broad range of project types. Baseline treatments are consistent with ODOT safety and operational requirements and are cost-effective in most applications. When considering the implementation of aesthetic treatments, ODOT intends for the cost of baseline treatments to be automatically included in the overall project construction cost. Therefore, there is no specific threshold or requirement for justifying the cost of baseline treatments. Some Local Planning Agencies (LPA's) have developed their own standard construction drawings that serve as baseline treatments within the LPA’s jurisdiction. On LPA projects with ODOT involvement, ODOT will consider waiving the ODOT baseline and substituting the LPA’s baseline on a case-by-case basis (if requested by the LPA). See Chapter 3 for ODOT’s process for incorporating baseline and enhanced aesthetic treatments into projects through ODOT’s Project Development Process (PDP).

**Enhanced Treatments:** There is no specific threshold or requirement for justifying the cost of enhanced aesthetic treatments implemented through environmental commitments made by ODOT during the NEPA process (i.e. minimization/mitigation measures). However, general funding guidelines do apply for enhanced aesthetic treatments desired by stakeholders (such as an LPA) or the public. During the design process, when ODOT determines that enhanced treatments are appropriate for a project based on stakeholder/public involvement, a detailed cost analysis is performed to determine (and justify) the cost of the desired enhanced treatments in comparison to the overall project cost. Once the cost proposal has been prepared, and before any commitment to stakeholders or the public has been made, the project’s aesthetic features will be presented to ODOT’s Aesthetics Committee (see Section 3.2). The Aesthetics Committee will review the project and the aesthetic needs/treatments and will decide ODOT’s funding level. Under most circumstances, funding of aesthetic enhancements beyond what ODOT feels is necessary or appropriate will be the responsibility of the stakeholder(s) requesting the enhanced treatments. However, due to the wide range of projects ODOT undertakes, with varying complexities, design issues, environmental impacts, and levels of stakeholder involvement, there are exceptions ODOT will consider on a case-by-case basis. Note: Enhanced treatments requested by local stakeholders will be handled by ODOT through an Alternative Bid process (see Section 2.3.3 below for additional information).

**NOTE:** Enhanced aesthetic treatments that are improperly planned and designed can result in unnecessarily high construction costs, excessive maintenance costs, and dissatisfied taxpayers. To avoid or reduce the likelihood of this potential situation, the design team and stakeholders should consider hiring aesthetic specialists for complex projects, such as (but not limited to) an aesthetic design consultant, graphics/visualization expert, landscape architect, and/or a lighting designer. The decision to hire an aesthetic specialist should be made early in the design process (preferably during Planning Phase). The fee for hiring the specialist may be considered by ODOT to be part of the stakeholder’s funding commitment for aesthetic enhancements and may be included in the Participation Agreement executed between ODOT and the stakeholder(s).
2.2.3 Participation Agreements

ODOT uses Participation Agreements to formalize funding and maintenance commitments between ODOT and the stakeholder. Typically, the stakeholder is a Local Public Agency (LPA). Since funding contributions and maintenance commitments for aesthetic enhancements are included in a Participation Agreement, it is a critical component in the design process. ODOT does not want to spend time and money coordinating and developing aesthetic enhancements that stakeholders desire but are unwilling to support.

ODOT prefers that preliminary participation discussions are initiated with stakeholders during the Planning Phase (ideally) or Preliminary Engineering Phase of the PDP (at the latest). These discussions should be documented by the design team. This documentation can include meeting minutes, public meeting comments, and phone/email records. During the Preliminary Engineering Phase, ODOT’s design team and the stakeholder should jointly develop a conceptual description of the desired aesthetic enhancements and discuss preliminary funding commitments, maintenance expectations, and associated costs (including life cycle costs). Summary documentation of these preliminary discussions should be included with the Stage 1 plan submittal (see Section 3.2.2 in Chapter 3 for documentation procedures).

ODOT then drafts the preliminary legislation and a formal Participation Agreement during detailed design (typically during the Environmental Engineering Phase and preferably prior to NEPA clearance). The legislation provides LPA signing authority and is a companion document to the Participation Agreement. Funding and maintenance commitments are included in the Participation Agreement. It is important to note that the agreement should include initial construction costs and long-term maintenance commitments. The final legislation is executed after final plans are submitted and ODOT’s Office of Estimating completes the official project cost estimate (see Sections 3.2.3 and 3.2.4 in Chapter 3 for additional discussion of timing and documentation procedures).

Aesthetic enhancements requested by stakeholders are handled by ODOT through an Alternative Bid process. Under this process, the project will bid the ODOT baseline and ODOT will accept alternative bid(s) for the requested enhancement(s). The alternative bid(s) will be compared against the executed Participation Agreement. If the alternative bid(s) exceed the funding commitments the local stakeholder has agreed to, ODOT will request additional funding participation from the stakeholder or choose not to accept the alternative bid(s) and implement ODOT’s baseline. If a situation arises during the bid process (or during construction) where a funding modification is necessary, an amendment to the Participation Agreement would be written by ODOT. Additional information on Participation Agreements (including agreement templates and procedures) can be found on ODOT’s Local Programs web page.

NOTE: As a general rule, funding contributions for aesthetic enhancements do not count toward a local match on federally funded projects. However, there are alternative funding sources that stakeholders can utilize for aesthetic enhancements. Stakeholders interested in funding options for aesthetic enhancements should contact the ODOT District LPA Coordinator for information. Additional information can be found on ODOT’s Local Programs web page.
2.2.4 Maintenance Considerations

Baseline aesthetic treatments on projects within ODOT’s jurisdiction are maintained by ODOT. ODOT also maintains enhanced aesthetic treatments incorporated into ODOT projects through impact avoidance/minimization efforts or environmental commitments made during the NEPA process. For LPA projects with ODOT involvement, baseline treatments within the LPA’s jurisdiction are maintained by the LPA unless otherwise agreed upon by ODOT. Additionally, in most circumstances, ODOT requires stakeholders (LPA or others) to maintain all other enhanced aesthetic treatments incorporated into a project design, regardless of how the enhanced treatments were funded for construction. Aesthetic enhancements that stakeholders are typically required to maintain include (but are not limited to): community signs/logos, decorative fencing/railing, decorative traffic signal poles/mast arms, decorative lighting, decorative landscaping (such as mulch, walls, irrigation systems, and special plantings), special pavement, sidewalk, retaining wall, or noise barrier textures/patterns/logos, brick or stone pavers, special colorants/sealers, and special site amenities (benches, shelters, etc). The stakeholder’s responsibility includes funding of the maintenance work and actual performance of the maintenance work, unless otherwise agreed to by ODOT. Designers and stakeholders should contact ODOT or consult ODOT’s design manuals for information regarding certain design elements (such as traffic signals) and the extent ODOT’s maintenance jurisdiction.

During the design process, the design team should discuss with stakeholders long-term (life cycle) maintenance costs, such as replacing special form liners, fading of colorants and sealants, weathering of signs and logos, electricity costs, light bulb or other electrical component replacement costs, and the potential for damage caused by drought, salt spray, vehicular crashes, and/or vandalism. It is the responsibility of ODOT’s design team to not only discuss maintenance requirements with stakeholders during the design process, but also to include maintenance commitments for aesthetic enhancements in the Participation Agreement (see Section 2.2.3). ODOT’s district highway management and roadway/bridge design staff should be the primary negotiators/reviewers of maintenance commitments/responsibilities to ensure they are feasible.

The Participation Agreement should specify which aesthetic treatments are the stakeholder’s responsibility and which treatments are ODOT’s responsibility (if applicable). The agreement should specify who is funding the maintenance work and who is actually performing the maintenance work. The agreement should also describe the timing and transition from ODOT/contractor responsibility to stakeholder responsibility, with respect to required post-construction maintenance of enhanced treatments.
CHAPTER 3: ODOT’S AESTHETIC DESIGN PROCESS

3.1 OVERVIEW OF ODOT’S PROJECT DEVELOPMENT PROCESS (PDP)

3.1.1 Overview of the PDP Pathways

ODOT has developed and implemented a Project Development Process (PDP) for projects that establishes scope of work and deliverables and provides for an integrated, multi-disciplined decision-making process. ODOT’s PDP includes regular communication among technical disciplines, results in quality plans, and minimizes cost overruns during right-of-way acquisition and project construction. The PDP forms the basis for legally-defensible actions by ODOT under the National Environmental Policy Act (NEPA).

The PDP is a project management and transportation decision-making process that outlines project development from concept through completion. Each PDP activity is timed to facilitate informed decisions based on an appropriate level of project development and risk management. The PDP encourages communication among disciplines, requires documentation of the reasoning behind project-related decisions, eliminates duplicated effort among disciplines, and provides for early identification of potential issues. Involvement of all disciplines during the early stages of project development ensures that issues affecting project type, scope, schedule, and costs can be correctly evaluated and anticipated.

Depending on size, complexity, and/or potential impact to the environment, ODOT transportation projects are categorized into one of five pathways (Paths 1-5). Selection of the appropriate project path is based on the anticipated level of project development complexity. The project path identifies the recommended level of analysis, amount of stakeholder/public involvement, and activities performed during each phase.

3.1.2 Applicable / Exempt Projects

As stated above, ODOT projects are categorized into one of five pathways in the PDP. ODOT continually develops its policies and guidance documents to be consistent with the PDP. For example, ODOT’s Categorical Exclusion (CE) Guidance groups specific project types into various levels based on complexity and anticipated environmental impacts, in accordance with 23 CFR 771.117. These groupings provide a useful tool in determining what level of analysis and stakeholder/public participation will typically be required with respect to aesthetic treatments.

Though ODOT considers aesthetics to be inherent to the development of transportation projects and encourages consideration of aesthetics on every project, the process by which ODOT implements aesthetic design within the PDP framework must account for a wide array of project types and does so with the understanding that not all projects can (or need) to be developed equally with respect to aesthetic treatments. Path 3, Path 4, and Path 5 projects requiring higher-level CE documents (D1, D2, or D3) inherently involve design complexities and environmental impacts that typically require a more extensive process for identifying, developing, and implementing appropriate aesthetic treatments. However, due to ODOT’s extensive maintenance program, the vast majority of ODOT projects are simpler Path 1 or Path 2 projects that involve lower-level CE documents (C1 or C2). Many of these projects provide little or no opportunity for
incorporating aesthetic treatments or substantially improving aesthetics in a transportation corridor. For this reason, most C1-level projects (as well as some C2-level projects) will not require consideration and development of aesthetic treatments within the PDP. These projects are categorized as “exempt” from ODOT’s aesthetic process. The following is a list of typical exempt project types:

Examples of Path 1 and 2 Project Types Exempt from Aesthetic Design Process

- Projects or activities that do not involve or directly lead to construction, such as:
  - Planning and technical studies
  - Technical and operating assistance
  - Designating highways as bike routes
  - Purchase of vehicles and equipment
  - Disposal of excess right-of-way or joint/limited use of right-of-way
  - Changes in access control
  - Acquisition of land for hardship/protective purposes
  - Land donations, land transfers, easement acquisitions

- Emergency repairs to be performed under a declaration by the Governor

- Minor maintenance or improvements to existing ODOT facilities (weigh stations, rest areas, maintenance garages, rideshare facilities)

- Installing or replacing electronic, communication, or information processing devices (excludes traffic signals and dynamic message signs)

- Maintenance or improvements to rail crossings or warning signals within ODOT right-of-way

- Closure/relocation of at-grade rail crossings

- Pavement resurfacing (mill-and-fill)

- Pavement marking/striping; painting shoulders for bike lanes

- Guardrail repair/replacement

- Culvert lining/culvert maintenance, minor culvert replacement

- Other minor maintenance projects within ODOT’s operational right-of-way that have limited visibility or limited effects on aesthetics within the transportation corridor, such as:
  - Clear zone spraying, mowing, brush removal/trimming
  - Ditch/drainage structure clean-outs
  - Minor bridge repair/rehab projects such as patching, new wearing surfaces, sealing wearing surfaces, bearing replacements, joint replacements, minor bridge railing/vandal fence repairs and other minor superstructure and substructure repairs (excludes painting or sealing any large/visible areas, bridge railing/parapet replacements, vandal fence replacements, deck replacements, beam/girder replacements, substructure replacements)
  - Pavement joint repair
  - Sign and fence repair
  - Lighting repair
  - Minor retaining wall and noise barrier repair

There are a number of Path 1 and Path 2 projects that are not exempt from ODOT’s aesthetic design process due to increased complexity and/or involvement with design elements that are fundamental to aesthetics in a transportation corridor. These non-exempt project types include:
3.1.3 Overview of the PDP Phases

Under any of the five PDP pathways, an ODOT project must advance through five sequential development phases: Planning, Preliminary Engineering, Environmental Engineering, Final Engineering/Right-of-Way, and Construction. ODOT’s PDP Manual includes a summary of each of the five project phases. Aesthetic treatments are considered in each of the five phases. Section 3.2 below describes the process for incorporating aesthetics into each project phase, including stakeholder/public involvement, documentation, and roles and responsibilities.

3.2 AESTHETICS IMPLEMENTED IN THE PDP

ODOT’s design process involves consideration of aesthetic treatments within each phase of the PDP, though the extent to which aesthetics are considered in each PDP phase depends on the type and complexity of the project, its setting in the local landscape, stakeholder/public input, and in some cases environmental impacts. As discussed in Section 3.1.2, consideration of aesthetic treatments on many Path 1 and simple Path 2 projects will not be required beyond the Planning Phase (“exempt” projects). More complex Path 3, Path 4, and Path 5 projects will typically require consideration of aesthetic treatments in every phase of the PDP. ODOT uses checklists to facilitate and document consideration of aesthetic treatments on all projects. The intent of the checklist approach is to:

- Provide simple, easy-to-use forms for guidance, documentation, and “follow-through” from the Planning Phase to the Construction Phase.
- Ensure aesthetic treatments are being considered throughout the PDP.
- Ensure appropriate aesthetic treatments are being considered.
- Ensure funding, design, environmental, stakeholder/public involvement, and maintenance considerations are being addressed in the development of aesthetic treatments.

Additional details outlining the process for addressing and incorporating aesthetic design into these and other ODOT projects are included in Section 2.2 of Chapter 2 and Section 3.2 below.

- Bridge replacement projects or rehabilitation projects that are not considered minor (as summarized on the previous page)
- Retaining wall rehabilitation (including tinting/sealing), replacement or installation projects
- Noise barrier rehabilitation (including tinting/sealing), replacement, or installation projects
- Highway rehabilitation/minor widening projects
- Grade separation projects
- Lane reduction (road diet) projects
- New bike/pedestrian projects
- New fencing/signage installation projects
- New rideshare facility construction projects
- New traffic signals or dynamic message signage construction projects
- New lighting installation projects
- Streetscape projects or landscape “beautification” projects
- Intersection improvement projects
3.2.1. Aesthetics in the Planning Phase

Overview: The purpose of the Planning Phase is to identify transportation problems, assess existing and future conditions, identify stakeholders, develop goals and objectives, define the Purpose and Need, and determine the scope, schedule and budget for the project. During the Planning Phase, the design team identifies and documents potential environmental, community, or design issues that may require consideration of aesthetic treatments.

IMPORTANT: A key Planning Phase component of the ODOT’s design process involves early identification of sensitive environmental resources in the immediate project vicinity that could result in environmental commitments requiring enhanced aesthetic treatments (such as historic properties or a designated scenic river). Another key component is early recognition of unique project types that could trigger stakeholder involvement resulting in enhanced aesthetic treatments (urban corridor and gateway interchange projects for example, or if a project is being sponsored by a local stakeholder). For these project types, early stakeholder coordination in the Planning Phase is highly recommended.

Stakeholder/Public Involvement: During the Planning Phase, the design team (typically the ODOT Project Manager and/or the Consultant Project Manager) may contact stakeholders to initiate discussions regarding aesthetics and potential design treatments. This is particularly important when there is an existing aesthetic theme within or adjacent to the project area, or when a Local Public Agency (LPA) is sponsoring a project and desires specific aesthetic treatments. For complex projects (primarily Path 3, Path 4, and Path 5 projects), a detailed Public Involvement Plan is a key component of the Planning Phase for the identification and development of appropriate aesthetic treatments. ODOT’s Public Involvement Manual should be consulted for additional information and guidance regarding public involvement and the PDP.

Checklists/Forms: The Aesthetic Strategy Checklist is used during the Planning Phase to initiate consideration/documentation of aesthetics and alert the design team of the potential for aesthetic enhancements. ODOT requires completion of this checklist on all projects as part of the PDP. The checklist consists of three sections containing various checkboxes for “yes/no” questions, as well as several detailed questions (for more complex projects).

- **Section A** addresses “exempt” projects (see Section 3.1.2). Path 1 and Path 2 projects that are considered to be exempt will only require completion of Section A for project file documentation. No other aesthetics documentation is required for exempt projects during the PDP.

- **Section B** addresses non-exempt projects that typically require only baseline aesthetic treatments. For these projects, Section A and Section B are completed for project file documentation. Additional documentation of baseline treatments is then performed during the Preliminary Engineering Phase and Environmental Engineering Phase (see Sections 3.2.2 and 3.2.3).

- **Section C** addresses issues typically associated with more complex projects (or projects sponsored by local stakeholders) that may require enhanced aesthetic treatments. For these projects, Section A, Section B, and Section C are completed for project file documentation.
Additional documentation is then performed during the Preliminary Engineering Phase and the Environmental Engineering Phase, and possibly the Final Engineering/Right-of-Way Phase and Construction Phase (see Sections 3.2.2 through 3.2.5). Note that Section C is intended to provide the design team with additional information on project types that are identified in Section B as having the potential for enhanced aesthetic treatments - but does not automatically trigger a higher level of analysis or coordination.

Responsibility and Timing: For exempt projects, completion of the Aesthetic Strategy Checklist (Section A only) is the responsibility of the ODOT Project Manager (PM). The ODOT PM (or other assigned staff) should complete Section A of the checklist during project scoping and include the checklist in ODOT’s project file (EnviroNet) and notify the District Environmental Coordinator (DEC). This completes the aesthetic design process for exempt projects. For all other projects, the ODOT PM (or other assigned staff) should prepare an initial draft of the Aesthetic Strategy Checklist during project scoping and then provide the checklist to the design team (including the Consultant Project Manager) to be finalized during the Planning Phase. The completed checklist is then uploaded to EnviroNet by the design team at the end of the Planning Phase and the ODOT PM is notified for review and approval. It is the ODOT PM’s responsibility (or the responsibility of other assigned staff members) to ensure that the Aesthetic Strategy Checklist has been appropriately filed at the conclusion of the Planning Phase. Then, using the Aesthetic Strategy Checklist as guidance, it is the responsibility of the design team to advance consideration of aesthetic treatments into Stage 1 design as the project proceeds through the Preliminary Engineering Phase.

3.2.2. Aesthetics in the Preliminary Engineering Phase

Overview: The purpose of Preliminary Engineering is to begin the process of collecting more detailed information by conducting field investigations, technical studies, and engineering. Stakeholder/public involvement is typically performed in this phase for Path 3, Path 4, and Path 5 projects. As a result of the environmental studies and preliminary design analyses performed during this project phase, as well as feedback obtained through the stakeholder/public involvement process, preliminary aesthetic treatments are developed, considered in the recommendation of a preferred alternative, and incorporated into Stage 1 design plans to the extent possible (most structural elements relevant to aesthetics are not designed in detail until Stage 2).

Stakeholder/Public Involvement: During the Preliminary Engineering Phase, the design team will typically conduct some level of stakeholder/public involvement. For Path 3, Path 4, and Path 5 projects, this stakeholder/public involvement will typically occur in the form of a formal public meeting. Additional stakeholder meetings may also be held to further advance discussions regarding aesthetic treatments that may be desired for the project, and to initiate discussion of Participation Agreements (if applicable). ODOT’s Public Involvement Manual should be consulted for additional information and guidance regarding stakeholder/public involvement specific to the Preliminary Engineering Phase and holding public meetings. ODOT’s Design Aesthetics Public Involvement Update should also be consulted for additional information and tools for soliciting public feedback on aesthetics during the Preliminary Engineering Phase. This guidance will be particularly relevant and useful for complex Path 3, Path 4, and Path 5 projects, when more extensive stakeholder/public participation (possibly involving small group workshops) may be warranted.
Checklists/Forms: During the Preliminary Engineering Phase, the Aesthetic Strategy Checklist is updated (as necessary) based on the results of environmental studies and stakeholder/public input. The design team then works with stakeholders (if applicable) to identify the appropriate level(s) of aesthetic treatments for the project (baseline vs. enhanced). If enhanced treatments are determined to be appropriate, the design team leads additional stakeholder coordination and further evaluates enhanced treatment options based on engineering, cost, stakeholder/public input, funding considerations, and “fit” within the surrounding landscape. Additional stakeholder coordination can be conducted via small group meetings, phone calls, and/or email and should be thoroughly documented by the design team. The stakeholder coordination effort should focus on further establishing the preliminary (conceptual) aesthetic treatment plan, as well as discussion of funding contributions and maintenance responsibilities. The design team then prepares the draft Aesthetic Funding Assessment Form and draft Aesthetic Design Checklist in conjunction with completion of Stage 1 Plans. Further discussion of these two documents is presented below.

- The draft Aesthetic Funding Assessment Form summarizes general project information, the overall level of aesthetics to be incorporated into the project (baseline vs. enhanced), the preliminary cost and funding information for enhanced treatments (if applicable), and alternative bid enhancement considerations. If the project only includes baseline treatments, the cost/funding section does not apply and is not filled out. This form includes signature blocks for the ODOT PM and an ODOT Aesthetics Committee representative to approve further development of proposed enhanced treatments. Completion of the draft Aesthetic Funding Assessment Form requires documentation of stakeholder coordination during the Preliminary Engineering Phase (as described above).

- The draft Aesthetic Design Checklist includes an array of checkboxes for the various types of aesthetic treatments that can be applied to a project (including alternative baseline treatments and alternative bid enhancements requested by local stakeholders). Since aesthetic treatments are often not apparent during review of a plan set (particularly by non-engineering team members), the purpose of this checklist is to provide simple documentation of treatments that are being proposed for a project.

The draft Aesthetic Funding Assessment Form, the draft Aesthetic Design Checklist, and supporting stakeholder coordination documents (if applicable) should be included with the Stage 1 design plan review submittal.
Responsibility and Timing: Completion of the draft Aesthetic Funding Assessment Form and the draft Aesthetic Design Checklist is the responsibility of the design team. These documents should be completed in conjunction with development of Stage 1 plans and should be included as part of the Stage 1 design plan review submittal. During the Stage 1 review process, the ODOT PM will coordinate these documents with the Administrator of ODOT’s Office of Environmental Services (OES). The OES Administrator will then coordinate with an Aesthetics Committee made up of office administrators from each of the following offices: Environmental Services, Structural Engineering, Roadway Engineering, Program Management, and Maintenance Operations. The Aesthetics Committee will review all requests for enhancements and waivers from the baseline conditions and either approve or request modifications to be addressed during Stage 2 design.

The draft Aesthetic Funding Assessment Form, draft Aesthetic Design Checklist, and Stage 1 plans are then uploaded to EnviroNet by the design team. It is the ODOT PM’s responsibility (or the responsibility of other assigned staff) to verify that the draft Aesthetic Funding Assessment Form and draft Aesthetic Design Checklist have been completed, reviewed and approved (or modified), and appropriately filed at the conclusion of the Preliminary Engineering Phase. Based on the Stage 1 plan review, it is then the responsibility of the design team to advance consideration and development of aesthetic treatments into Stage 2 design as the project proceeds through the Environmental Engineering Phase.

3.2.3. Aesthetics in the Environmental Engineering Phase

Overview: The purpose of Environmental Engineering is to perform detailed environmental analysis of the preferred alternative, concurrently with detailed engineering and other technical studies. Additional stakeholder/public involvement is typically performed during this phase (particularly on complex Path 3, Path 4, and Path 5 projects) and Stage 2 design plans are developed. During the Environmental Engineering Phase, aesthetic design treatments based on environmental studies, stakeholder/public input, and engineering principles are finalized, incorporated into the design plans, and summarized in the NEPA document. Many basic components of aesthetic design are developed (and finalized) during Stage 2, including structure,
roadway, landscaping, drainage, lighting, and utility details. The NEPA document will contain environmental commitments involving the aesthetic design treatments.

NOTE: Many components of aesthetic design are developed in detail during the Environmental Engineering Phase, and for some structural elements, such as bridges and walls, the basic configuration must be finalized before Stage 2 can be submitted. Basic configurations include geometric shapes, dimensions, etc. Changes to dimensions after Stage 2 will cause delays in the schedule due to redesign and detailing.

IMPORTANT: As mentioned in Section 3.2.2, the aesthetic treatment plan (as well as Participation Agreements) should be finalized during the Environmental Engineering Phase and the final Aesthetic Funding Form and final Aesthetic Design Checklist should be approved concurrently with NEPA approval. Changes to the aesthetic treatment plan (other than minor design adjustments) should not occur after NEPA approval and completion of the Environmental Engineering Phase.

Stakeholder/Public Involvement: Similar to the Preliminary Engineering Phase, the design team will typically conduct additional stakeholder/public involvement during the Environmental Engineering Phase. For complex Path 3, Path 4, and Path 5 projects, this will often occur in the form of another formal public meeting. Additional stakeholder meetings may also be held to advance discussions regarding aesthetic treatments that may be desired for the project. Participation Agreements and associated preliminary legislation are drafted during the Environmental Engineering Phase. Resource-specific public involvement is also typically held during the Environmental Engineering Phase. Resource-specific public involvement typically involves Noise, Section 4(f), or Section 106 issues, but rarely consist of stand-alone public meetings (typically these are combined with the public meeting held during the Environmental Engineering Phase to review updated design plans). ODOT’s Public Involvement Manual should be consulted for additional information and guidance regarding public involvement specific to the Environmental Engineering Phase, holding public meetings, and addressing resource-specific public involvement. ODOT’s Design Aesthetics Public Involvement Update should also be consulted for additional information and tools for soliciting public feedback on aesthetics during the Environmental Engineering Phase. This guidance will be particularly relevant and useful for complex Path 3, Path 4, and Path 5 projects, when more extensive stakeholder participation (such as small group workshops) may be warranted.

Checklists/Forms: During the Environmental Engineering Phase, the design team further evaluates and develops aesthetic treatments based on engineering, cost, and funding considerations, as well as stakeholder/public input and environmental commitments. The design team then prepares the final Aesthetic Funding Assessment Form and final Aesthetic Design Checklist in conjunction with completion of Stage 2 design plans. As mentioned above, Participation Agreements and associated preliminary legislation are also drafted, if applicable.

- The final Aesthetic Funding Assessment Form is prepared by updating the draft Aesthetic Funding Assessment Form (see Section 3.2.2) with additional information developed during the Environmental Engineering Phase. This form includes signature blocks for the ODOT PM and an ODOT Aesthetics Committee representative to approve further development of proposed enhanced treatments.
The final Aesthetic Design Checklist is prepared by updating the draft Aesthetic Design Checklist with additional information developed during the Environmental Engineering Phase.

Participation Agreements and preliminary legislation are drafted during the Environmental Engineering Phase, if applicable. The Participation Agreement, in part, formally establishes a stakeholder’s intent to contribute funding of desired aesthetic enhancements and/or provide required maintenance for aesthetic enhancements. The preliminary legislation gives the stakeholder signing authority and is a companion document to the Participation Agreement.

The final Aesthetic Funding Assessment Form, final Aesthetic Design Checklist, and Participation Agreements (if applicable) should be included with the Stage 2 design plan review submittal.

Responsibility and Timing: Completion of the final Aesthetic Funding Assessment Form and the final Aesthetic Design Checklist is the responsibility of the design team. Preparation and coordination of Participation Agreements (and preliminary legislation) are the responsibility of ODOT’s PM, the district LPA Coordinator, and appropriate ODOT district management staff. These documents should be completed in conjunction with Stage 2 plans and should be included as part of the Stage 2 design plan review submittal. During the Stage 2 review process, the ODOT PM will coordinate these forms and agreements with the Administrator of ODOT’s Office of Environmental Services (OES). The OES Administrator will then coordinate with an Aesthetics Committee made up of office administrators from each of the following offices: Environmental Services, Structural Engineering, Roadway Engineering, Program Management, and Maintenance Operations. The Aesthetics Committee will review and provide final approval concurrently with NEPA document approval. In some instances, minor adjustments may be requested by the Aesthetics Committee to be addressed in Stage 3 design. Note: Substantive changes to the aesthetic treatment plan, including changes to basic structural details (such as bridge and retaining wall configuration and dimensions) will result in project delay and should be avoided during Stage 3 design.

The final Aesthetic Funding Assessment Form, final Aesthetic Design Checklist, and approved Stage 2 plans are then uploaded to EnviroNet by the design team. It is the ODOT PM’s responsibility (or the responsibility of other assigned staff) to verify that the final Aesthetic Funding Assessment Form and final Aesthetic Design Checklist have been completed, reviewed and approved (or modified), and appropriately filed at the conclusion of the Environmental Engineering Phase. It is the ODOT PM’s responsibility to verify that Participation Agreements appropriately address aesthetic enhancements and have been executed and coordinated with the Stage 2 plans. Based on the results of the Stage 2 plan review, it is then the responsibility of the design team to finalize development of aesthetic treatments during Stage 3 design as the project proceeds through the Final Engineering/Right-of-Way Phase.
3.2.4. Aesthetics in the Final Engineering/Right-of-Way Phase

Overview: The purpose of Final Engineering/Right-of-Way is to complete final (Stage 3) design of the preferred alternative and finalize right-of-way acquisition for the project. This phase builds upon and refines the Stage 2 design work completed during the Environmental Engineering Phase. Several key components of aesthetic design are finalized during Stage 3, including lighting, signing, and traffic signal details. Aesthetic treatments listed in the NEPA document and Environmental Commitments Summary are finalized during Stage 3 plan development, as necessary.

Stakeholder/Public Involvement: For most projects, stakeholder/public involvement activities will have been completed prior to this phase; however, it is possible that additional small group meetings and/or resource agency meetings may occur during the Final Engineering/Right-of-Way Phase, particularly on complex Path 4 and Path 5 projects that involve extensive enhanced aesthetic treatments or environmental commitments. ODOT’s Public Involvement Manual and Design Aesthetics Public Involvement Update should be consulted for additional information and guidance regarding public involvement specific to the Final Engineering/Right-of-Way Phase, holding public meetings, and addressing resource-specific public involvement.

Checklists/Forms: During the Final Engineering/Right-of-Way Phase, the project design plans (including all proposed aesthetic treatments) are finalized for construction. If necessary, the design team updates the final Aesthetic Funding Assessment Form and final Aesthetic Design Checklist, as well as Participation Agreements (Note: Substantive modification to these forms and agreements during Stage 3 plan development should not be a common occurrence and should be avoided or minimized). The final Aesthetic Funding Assessment Form, final Aesthetic Design Checklist, and Participation Agreements should be included with the Stage 3 design plan review submittal (even if the forms/agreements have not been updated during the Final Engineering/Right-of-Way Phase). Final legislation is prepared by ODOT’s Office of Estimating once the official project estimate is complete.

Responsibility and Timing: Updating the final Aesthetic Funding Assessment Form and the final Aesthetic Design Checklist (if necessary) is the responsibility of the design team. Finalizing Participation Agreements (if applicable) is the responsibility of ODOT’s PM, the district LPA Coordinator, and appropriate ODOT district management staff. These updates should be completed in conjunction with development of Stage 3 design plans and should be included as part of the Stage 3 plan design plan review submittal. During the Stage 3 review process, if no substantive changes have been made to the aesthetic treatment plan, ODOT’s PM approves all aesthetic treatments for construction. In the unlikely event there has been substantive changes due to lingering stakeholder coordination issues or environmental commitment issues, the ODOT’s PM should coordinate the final forms and agreements with ODOT’s Office of Environmental Services (OES) Administrator for final Aesthetics Committee approval and construction. Note: This could result in a re-evaluation of the NEPA document and project delays and should be avoided unless there are unique project circumstances.
The final Aesthetic Funding Assessment Form, final Aesthetic Design Checklist, and approved Stage 3 plans are then uploaded to EnviroNet by the design team. It is the ODOT PM’s responsibility (or the responsibility of other assigned staff) to verify that the final Aesthetic Funding Assessment Form and Aesthetic Design Checklist have been completed, reviewed/approved by ODOT’s PM and Aesthetics Committee (as applicable), and appropriately filed at the conclusion of the Final Engineering/Right-of-Way Phase. It is the ODOT PM’s responsibility to verify that Participation Agreements appropriately address aesthetic enhancements and have been executed and filed with the Stage 3 plans. As previously noted, final legislation is prepared by ODOT’s Office of Estimating once the official project estimate is complete.

3.2.5. Aesthetics in the Construction Phase

Overview, Responsibilities and Timing: During the Construction Phase, the construction contract is advertised and awarded. A pre-bid meeting is sometimes held during advertisement and a pre-construction meeting is held for every project after project award. During these meetings, ODOT reviews enhanced aesthetic treatment specifications with the contractor(s), if applicable.

Field inspection of aesthetic enhancements will then be performed during construction for consistency with design plans and compliance with environmental commitments made as part of the NEPA process. The field inspections will typically be performed by ODOT environmental or construction staff, or by consultant representatives on behalf of ODOT. Since nearly all aesthetic enhancements are implemented as a result of ODOT/stakeholder agreements or ODOT/regulatory agency agreements (and may provide compliance with state and federal law), failure to comply and follow through with these actions can result in loss of federal funding and approvals, degraded public and agency relations, fines, schedule delays, and/or potential criminal charges.

Therefore, the inspection and documentation of aesthetic enhancements will be handled through ODOT’s Environmental Commitment Monitoring Report process. The Environmental Commitment Monitoring Report is a template used by ODOT to document compliance during construction through onsite observations. The field inspector should update the form to include only the applicable construction commitments for each project. Once the report is complete for each onsite inspection, it should be uploaded to EnviroNet to document compliance. It is the DEC’s responsibility to verify that the field inspections are being performed at appropriate construction milestones and the report is completed and uploaded to EnviroNet to demonstrate compliance.

Following completion of construction, ODOT will maintain all baseline aesthetic treatments within its jurisdiction and all aesthetic enhancements related to environmental commitments from the NEPA process. Stakeholders are typically required to maintain all other aesthetic enhancements, as agreed upon in Participation Agreements. This completes ODOT’s aesthetic design process. See Page 3-12 for a graphic summary of the aesthetic design process.
3.2.6. Aesthetics on Design-Build Projects

ODOT’s Design-Build Process combines design and construction of a project into one contract. The design firm and construction contractor become a team, working concurrently on the design and construction phases of a project, expediting delivery. The time savings in design-build projects is realized by eliminating the lead time necessary to contract a designer and accept bids from contractors to build the design. Projects move from design to construction faster through use of the single design-build contract. Because the designer and contractor work in tandem, the contractor’s changes can be incorporated into the design phase, eliminating the need for costly and time-consuming changes during construction. This benefit also allows ODOT to estimate project cost early in the PDP, allowing for more effective budget planning.

**IMPORTANT:** Compliance with aesthetic commitments is critical on all ODOT projects, including design-build projects. The design-build scope and contract must describe in detail aesthetic design requirements for the project and provide the design-build team with guidance on procedures to follow if any adjustments are necessary during design/construction. This will ensure that aesthetic treatments are appropriately incorporated into the project and ensure compliance with stakeholder agreements and environmental commitments is achieved.
The initial identification process for aesthetic treatments on a design-build project is essentially the same as a conventional project (see Sections 3.2.1 and 3.2.2 above). Though the decision to develop a project using the design-build process (as opposed to standard design-bid-build process) may not be made until the Preliminary Engineering Phase, NEPA approval is normally obtained prior to the award of the design-build contract. Consequently, baseline and enhanced treatments that are agreed upon during the NEPA process are established before the design-build scope is written and the contract is awarded.

However, the design-build approach presents some implementation challenges for the aesthetic design process. With a design-build project, requirements for enhanced aesthetic treatments must be incorporated into the design-build scope and contract with limited supporting engineering analysis and design details (typically Stage 1-level plans). Additionally, the designer and contractor must be granted flexibility by ODOT to develop a project according to the conditions of the site, safety, design standards, and transportation demands. Disputes and change-order requests can arise when site conditions and engineering issues identified by the design-build team conflict with stakeholder agreements and environmental commitments made with limited design details during the NEPA process. Therefore, it is crucial that the design-build contract includes as much information as possible regarding aesthetic design requirements but allows the design-build team appropriate flexibility for addressing any changes that may be necessary to construct the project and provides guidance on how the design-build team is to communicate and coordinate any necessary changes.

ODOT should also coordinate with stakeholders (including resource agencies, as necessary) during the development of the design-build contract to provide education and information regarding the design-build process, the potential for design changes during construction that may affect environmental commitments and/or the aesthetic design plan, and the need to maintain open lines of communication throughout the entirety of the design-build process.
CHAPTER 4: AESTHETIC PRINCIPLES

4.1 CORRIDOR VISION

The basic unit of transportation design is the corridor. A unified and visually appealing design for a corridor, either through incorporation of baseline treatments, enhanced treatments, or both, requires a corridor vision and an understanding of basic corridor types. A vision for a transportation project refers to the mental image used to inspire and unify the design of the project. The corridor vision integrates the aesthetic and functional goals of a project within a specific corridor type and inspires design decisions. The development of a corridor vision results in a cohesive, unified design for the entire length of a corridor. A corridor vision takes two basic factors into account: the view from the roadway to the adjacent community, and the view of the roadway from the adjacent community.

Understanding how different views influence the community and its environment is crucial in determining the appropriate corridor vision. The evaluation of a project may indicate that a corridor vision already exists. If so, the aesthetic goal should be to incorporate or extend this vision into the project. It is important to recognize that every community is unique. Each has a combination of natural and developed landscapes, history, and culture. An interdisciplinary team can help the designer understand and incorporate a community’s sense of place into the project. Corridors in urban areas could include an emphasis on the views toward landmarks and skylines to reinforce the sense of place. In rural areas, natural and agrarian environments can be emphasized to provide a seamless integration of the landscape and rural roadway. The transition between rural and urban areas is enhanced by heightening the traveler’s sense of arrival into a different environment.

4.2 CORRIDOR TYPES

There are six basic corridor types: 1) urban highway corridor, 2) suburban highway corridor, 3) rural highway corridor, 4) gateway corridor, 5) street corridor, and 6) scenic highway corridor. Each of these corridor types is summarized below, including differentiating characteristics and primary aesthetic design objectives and considerations.
Urban Highway Corridor

Urban Highway Corridors include high-density and low-density corridors. High-density corridors are typically associated with “downtown” or central business district areas. These corridors have closely-spaced intersections or interchanges with numerous overpass and retaining walls, and extensive highway lighting. The right-of-way is typically lined with large buildings and there are few greenspaces. Low-density corridors are typically associated with “uptown” areas and in certain settings can be considered gateway corridors. These corridors have slightly wider-spaced intersections or interchanges (compared to high density urban corridors), extensive highway lighting, and frequent overpass structures and retaining walls. Noise barriers are also common in low density urban corridors. The right-of-way is typically lined with a mix of commercial and residential properties and greenspaces. Urban Highway Corridor projects often have local stakeholder involvement resulting in aesthetic enhancements, particularly at major interchanges and bridge crossings. Aesthetic design considerations include (but are not limited to):

- Reducing, simplifying, and coordinating structural and visual elements.
- Using basic geometric and repetitive patterns and textures that simplify the scene.
- Unifying patterns, colors and textures of the various elements.
- Making signing and lighting uncluttered and consistent.
- Using trees, shrubs, and fencing to buffer and screen unattractive views.
- Incorporating urban themes and local heritage.

Suburban Highway Corridor

Suburban Highway Corridors often include interstate highway beltways around metropolitan areas or major arterial highways radiating outward from metropolitan areas. The right-of-way is typically lined by modern office buildings, commerce parks, strip malls, restaurants, residential subdivisions, and greenspaces. These corridors have more widely-spaced interchange and intersection spacing (compared to Urban Highway Corridors). Overpass bridge structures, noise barriers, and highway or street lighting are common in Suburban Highway Corridors. In certain settings, Suburban Highway Corridors can be considered Gateway Corridors. Suburban Highway Corridor projects often have local stakeholder involvement resulting in aesthetic enhancements, particularly in interchange areas and where arterial corridors pass through municipalities and suburban townships. Aesthetic design considerations include (but are not limited to):
• Utilizing more complex and eye-catching geometric patterns and textures.
• Utilizing free-flowing landscaping and contoured landforms where space allows.
• Maintaining open views of attractive areas and retail/shopping destinations for travelers.
• Eliminating or screening unattractive views.
• Incorporating local community themes.

Rural Highway Corridor

Rural Highway Corridors typically have widely-spaced interchanges and intersections, and are characterized by open views of agricultural fields, farmsteads, woodlands, streams, and rural residential properties. Structural elements that are common in urban and suburban corridors (such as noise barriers, retaining walls, lighting, and overpass structures) are less common in Rural Highway Corridors, and lower levels of stakeholder involvement and aesthetic enhancements can be expected. Aesthetic design considerations for rural corridors include (but are not limited to):

• Complimenting and blending structural elements into the natural landscape.
• Creating natural points of interest by maintaining open views.
• Reinforcing existing landscape features.
• Maintaining unity over longer distances.
• Minimizing signage and lighting; avoiding clutter.
• Utilizing free-flowing landscaping and contoured landforms.
Gateway Corridor

Gateway Corridors are typically urban or suburban interstate highways or major arterial highways leading into a city’s downtown or central business/entertainment district. A Gateway Corridor can also be an interchange or a highway segment that serves as a primary entrance to a local community, a major university or recreational area, or other significant point of interest. It can be a section of highway at a state border crossing. Gateway Corridor projects typically have substantial local stakeholder involvement resulting in high levels of aesthetic enhancements, particularly in interchange areas that serve as a local community’s primary access point. Therefore, a typical aesthetic design goal in a Gateway Corridor is to make a visual statement. Aesthetic goals and objectives in a Gateway Corridor can be achieved with special attention to bridges, walls, signing, lighting, and landscaping features, which create a clean, unified, and memorable appearance that is consistent throughout the corridor. Additional aesthetic considerations include (but are not limited to):

- Creating a unified and signature look for the corridor.
- Utilizing bold and vibrant patterns, shapes, materials, colors, and textures designed to be eye-catching and announce the traveler’s arrival in a specific place.
- Preserving or accentuating views of a skyline, a river corridor, or other scenic features.
- Incorporating iconic themes associated with a specific community or region.

Street Corridor

Street Corridors include the primary local road and street network within urban and suburban areas, and typically occur within municipalities. The Street Corridor is often characterized by two and three-lane roadways, low traffic speeds, frequent intersections/traffic lights, crosswalks, on-street bike lanes, on-street parking, tree lawns and sidewalks, and street lighting. The right-of-way is typically lined by numerous residences and small businesses. Older neighborhoods may contain historic properties or historic districts. Street Corridor projects typically have substantial stakeholder involvement and are often sponsored by a Local Public Agency (LPA). Aesthetic enhancements are common on these projects, particularly at major bridge crossings and on street corridors through (or in close proximity to) a community’s downtown area or central business district. Aesthetic enhancements along Street Corridors can also occur through environmental commitments established during the NEPA process to address impacts to sensitive features (such as historic areas or parks). Aesthetic design considerations include (but are not limited to):
Aesthetic Principles

- Integrating or enhancing pedestrian facilities and ensuring ADA compliance.
- Incorporating traffic calming design elements.
- Utilizing soft textures, shapes, materials, and colors to enhance the calming effect.
- Preserving or accentuating existing landscaping.
- Incorporating local community themes and heritage.
- Making signing, lighting, and intersection treatments uncluttered and consistent.
- Including amenities such as benches, shelters, and trash receptacles.

Scenic Highway Corridor

Scenic Highway Corridors include routes that have received state or national scenic byway designation. A Scenic Highway Corridor can involve a route with historical significance (Lincoln Highway Historic Byway), an area of social or religious significance (Gateway to Amish Country), or a bridge crossing over one of Ohio’s designated State or National Scenic Rivers. These corridors include intrinsic qualities of varied significance. The Scenic Highway Corridor is often characterized by open views of major river corridors (Ohio River), large bodies of water (Lake Erie), downtown skylines, and picturesque natural or geological features (Hocking Hills). The aesthetic vision for a Scenic Highway Corridor can enhance the essential qualities that have been identified in the corridor management plan. Scenic Highway Corridor projects typically have substantial agency involvement and/or stakeholder involvement. Aesthetic enhancements are common on these projects, either through stakeholder involvement or through environmental commitments established during the NEPA process to address or minimize impacts to sensitive features (such as historic areas, parks, or designated scenic rivers). Aesthetic considerations in Scenic Highway Corridors include (but are not limited to):

- Preserving or enhancing the intrinsic qualities that make the area scenic.
- Incorporating relevant historic, cultural, and geological qualities into the design.
- Keeping colors, textures and patterns relevant to the scenic features of the area.
- Maintaining unity through the repetition of similar shapes and using natural materials.
- Minimizing signage and lighting; avoiding clutter.
- Utilizing free-flowing landscaping and contoured landforms consistent with the area.
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4.3 VISUAL DESIGN ELEMENTS

Travelers see a highway or street corridor in its broad setting before they see its individual parts (bridges, lights, and landscape features). This experience is a visual success when all the parts fit and are compatible with their surroundings. Analyzing the visual design elements of a corridor or a specific feature within the corridor makes it easier to predict how people will perceive it. The primary visual design elements include line, form, color, shape, pattern, texture, and relief.

Line

A line is a direct link between two points, either real or implied. The strongest lines in a highway or street corridor are created by pavement edges and bridge girders. Other prominent lines are created by railings, parapets, piers, abutments, and retaining walls and noise barriers. Our aesthetic reaction to this overpass bridge is strongly influenced by the attractiveness of its parallel curvilinear lines.

Form

Form reveals objects in three dimensions, adding depth to the height and width of shape. The visual experience of moving under or over a bridge is primarily influenced by the form of the bridge, its geometry, span arrangement, horizontal alignment, vertical profile, and relationship to adjacent structures. The form of a roadway is seen in the context of spaces that create its environment. The three-dimensional form of this rural highway is a result of the interaction of the pavement, the slopes, and the larger landscape of which it is a part.
Color

Color can be applied to define, clarify, accentuate, or subdue the visual effects of structural elements. Warm colors (yellows and browns) tend to emphasize the presence and size of forms, whereas cool colors (blues and greens) diminish the visual importance of the elements to which they are applied. Intensity of color can enhance or diminish the effects just described. Colors are perceived differently at different times of the day and at different times of the year because of changes in light conditions and atmospheric conditions. Colors are also influenced by the background against which they are seen, and their appropriateness is often judged in terms of their fit with their background. Background is particularly important for most highway color selections because the highway element is almost always a small part of a much larger scene, the colors of which are outside the designers control. Intense colors, whether natural or introduced, enhance the importance of a highway elements. In this photograph, the vibrant blue bridge girders and light neutral piers and parapet compliment the sky color in the background and sharply contrast the colorful foliage in the foreground.

A designer has the option to blend or contrast structural elements with the surroundings. Elements seen against the sky will blend into the sky if blue, light gray or silver colors are used. Elements seen against woodlands will blend in best with greens, dark grays and browns. Within the highway environment, it is generally best if light, neutral colors (beige, tan, light gray) are used for the larger surfaces such as walls, abutments, and parapets. Deeper colors can be used on smaller areas like girders, railings, poles, and sign structures to create accents. The coordination of colors seen together needs to be considered, as well as the color of separate elements seen in succession. Generally, colors work best in these conditions if they are from the same color family. A color concept that is successful in most applications is the use of light neutrals for the large concrete surfaces, with a contrasting color for the smaller metal surfaces. Color choices in unique corridor settings (such as an urban corridor) can be influenced by local traditions, culture or architecture. The successful color concept in this photograph uses light neutrals for the concrete surfaces, and a vibrant contrasting color for the metal surfaces.
Shape

When a line closes, it forms a two-dimensional surface with spatial directions of height and width. This two-dimensional surface is the shape. The haunch of these girders provides a more interesting and attractive shape than girders with parallel edges. It also indicates how the girders works structurally - it makes the girders appear deepest over the piers where the forces are the highest.

Pattern, Texture, and Relief

Texture is found on the surface of all objects and is closely related to form. Texture helps define form through subtle surface variations and shadings. It can be used to soften or reduce imposing scale, add visual interest, and introduce human scale to large objects such as piers, abutments, and retaining walls. Distance and motion alters the perception of texture. When viewed from a distance or at high speeds, fine textures blend into a single tone and appear flat. As a rule, the greater the distance, the higher the observer’s speed, or the larger the object to which it is applied, the coarser or larger the texture must be. The bold texture of the wall in this photograph creates shadows that are noticeable at highway speeds.

Concrete is a construction material used frequently because of its durability, strength, and relatively low cost. Texture or patterns add visual interest to concrete and provide surface variations and shading which reduce the scale of an object. Patterns can be geometric, random, or figurative. The choice depends on the design vision for the project and on the characteristics of other nearby elements. In general, random and natural patterns work best when seen against wooded or other natural backgrounds; geometric and figurative backgrounds work best when seen against man-made backgrounds. Textural elements need to be large enough to create defined shadows that can be viewed at highway speeds. There are numerous possibilities for creating patterns, relief, and shadow lines through use of concrete form liners, form work, panels, and other devices, as depicted in this photograph.
Mechanically stabilized earth (MSE) walls are increasingly common and are faced with repetitive precast concrete units that give the wall a geometric pattern. Left alone this can be monotonous, particularly on large walls. However, options exist for improving the appearance. One option is to vary the thickness of the elements or create projections on the elements which create shadow lines and give the wall a unique appearance. Another is to use form liners to texture the concrete in ways that either emphasize or hide the element joints. *This photograph shows an MSE wall that was textured using an ashlar block form liner.*

### 4.4 VISUAL DESIGN QUALITIES

Aesthetic qualities result from the appropriate arrangement of visual design elements and are used to evaluate a visual composition. These design qualities are intangible; they are perceived qualities that arise from relationships of design elements. Basic visual design qualities include balance, order, rhythm, harmony, proportion, scale, contrast and unity.

**Balance**

Visual balance is the perceived equilibrium of design elements around an axis or focal point. Rather than a physical balance, it may also refer to equilibrium of abstract elements of design, such as masses, visual weights or texture. *Highway compositions typically work best when balanced about the median centerline, as depicted in this photograph. Thus, the various features within the highway corridor appear balanced.*

**Order, Rhythm, and Harmony**

Order is the arrangement of design elements so that each element has a proper place and function. Rhythm is a method of creating order by repeating similar elements in, on, or around a structure. Harmony means that elements of a design have visual similarity. These qualities are related and should be complementary in design. If planes or lines in a design have more dissimilar characteristics than similar characteristics, they are not likely to be perceived as harmonious. When these elements create a flow, which is satisfying to the eye, order and rhythm are created. *In this photograph, the consistent pier shape, repetitive images, and parallel curvilinear lines in the superstructure give the bridge an ordered, rhythmic, and harmonious appearance.*
On bridges, major rhythms can be created by the repetition of similar pier shapes. Minor rhythms can be created by the spacing of light poles, post spacing, or even the horizontal rustication on a pier. Landscaping design can also create rhythm through repetition of specific plantings or groups of plantings. *In this photograph, the repetitive pier and girder shapes and consistent span widths create a major rhythm, while the light poles and pilasters create a minor rhythm, and the appearance of order and harmony.*

### Proportion and Scale

Proportion is a method of creating a sense of order by assigning appropriate sizes to various design elements. The goal is appropriate proportions between the specific parts of a structure: between its height, width, and depth; between solids and voids; between surfaces and openings; and between areas of sunlight and shadow. Proportion can suggest the order of significance of the elements or the role played by the elements in a structure. Scale refers to the size relationship among various features of a highway (or bridge) and between the highway (or bridge) and its surroundings. Since most design involves elements that are to be used (or viewed) by people, a size/scale connection exists between the human body and the designed elements. We often refer to this as “human scale”. *In the first photograph (Adams Street), the deep concrete girders, short spans, large overviews, and low height give this bridge a bulky appearance and leaves the impression that it is not appropriately scaled for its setting. In second photograph (I-70/I-75), the airplane images on the retaining wall are correctly sized and spaced for viewing at highway speeds without distraction.*

### Contrast

Contrast relieves the monotony of simple harmony by complementing the characteristics of some design elements with their opposites. This adds a heightened awareness of each other. Contrast often takes the form of dramatic differences in color or light and shadow. *In this photograph, the shadow created by the bridge deck overhang combined with the deep blue girders, the light neutral concrete, and the dark neutral railing provide visually appealing contrasts.*
A second principle of contrast is that of dominance, where one contrasting element commands visual attention over the others. That element becomes the dominant feature and the others become the supporting background. A dominant theme is often essential in creating a pleasing aesthetic experience. The black light poles, black traffic signal poles, and black signal faces at this suburban intersection sharply contrast the light blue sky and light gray pavement, thus becoming a dominant visual feature in the corridor.

Unity

Unity provides the observer with a sense of wholeness. This is generated by a central or dominating perception in the composition. It encompasses the perfect application of all the other qualities, and it refers to the combined effects of all other aesthetic qualities applied simultaneously. Unity is the condition, or state, of full resolution of the site and project functions. It implies harmony where all the elements are in accord, thus producing an undivided total effect. The combined visual effects of structural and landscaping treatments in this highway interchange provide a unified appearance.

4.5 AESTHETIC PERCEPTION ON THE HIGHWAY

Before making specific aesthetic design decisions, a project designer must understand and consider the limitations and abilities of the eye. The relevant principles of vision in motion are:

- Seeing takes time. It takes about a second to change focus from seeing the speedometer on the dashboard to seeing detail on the road ahead. This time is significant, because at 60 miles per hour the observer is moving at 88 feet per second. Nearby objects move across the field of view very rapidly and may be missed in the interval between one glance and the next.

- As speed increases, concentration increases. As speed increases, the number of things to be seen and attended to increases proportionately. It becomes increasingly dangerous to observe irrelevant objects and concentration becomes fixed on the approaching ribbon of road.

- As speed increases, the point of concentration recedes. The eyes are feeling their way ahead of the wheels; the focus point at 25 mph lies approximately 600 feet ahead on the road. This distance increases as speed increases. At 45 mph, the fixation point lies some 1,200 feet ahead; at 65 mph, it is as far as 2,000 feet ahead.
4.6 AESTHETIC DESIGN HIERARCHY

Principal Factors

As might be expected, there is no single design parameter that controls the physical characteristics of a project. An attractive project has the orchestration of design parameters employed simultaneously to complement each other. However, some elements will have more influence than others on the final result. Because of the influence of motion on perception, it is generally the larger elements and their shapes, forms, proportions and other characteristics that will be the principal factors. These principal aesthetic design factors can be the visual basis upon which the balance of the appearance is built. Designers can concentrate on developing the best design solutions for these parameters prior to considering other visual treatments. To find the best design solution, they can consider previously-established aesthetic objectives when making decisions regarding these design parameters.

Secondary Factors

Secondary aesthetic design factors can be used to accentuate positive qualities that have been created by the principal aesthetic design factors. Details, texture and color can be engaged to draw attention to, or to detract from, the role of structural elements. When considering the secondary aesthetic design factors, designers can consider the aesthetic qualities previously defined.

4.7 AESTHETIC DESIGN OBJECTIVES

There are many approaches to aesthetic quality. Given the difficulty of the driving task and the paramount need for safety, aesthetic objectives should aim for clarity, balance, simplicity, harmony, and a sense that the environment is satisfying expectations. Designers can have visual objectives for the projects they design, just as they have objectives for safety, economy, or
serviceability. Similar to engineering objectives, aesthetic design objectives should be established early in the design process, so they can serve as an aesthetic compass. These objectives are all components of the aesthetic vision, which is the mental image underlying the design of the project.

When developing aesthetic design objectives for a project, designers can evaluate each part of the highway in terms of the whole, and the whole highway in terms of the setting and the corridor. Ideally, aesthetic objectives would be quantitative and therefore easily measured. However, given the subjective nature of aesthetics, visual goals are primarily qualitative. Therefore, aesthetic design objectives should be considered throughout the design process, and in particular when decisions are being made about the project and its setting. Establishing clear objectives and referring to them throughout the decision-making process will ensure a successful aesthetic design. Chapter 3 of this guidance document describes the process ODOT uses to develop and evaluate aesthetic design objectives and aesthetic treatment plans within the PDP. Appendix A includes supporting checklists and forms for designers to use to help guide and document consideration of aesthetic design objectives and the development of aesthetic treatment plans. Chapters 5 and 6 provide basic guidelines and case studies for designers to review and consider throughout the aesthetic design process.
CHAPTER 5: AESTHETIC GUIDELINES

This chapter provides aesthetic guidelines for use on ODOT projects, Permit projects on ODOT facilities, and Local Public Agency (LPA) projects that use federal funds and follow ODOT’s Project Development Process (PDP). As discussed in Chapter 4, aesthetic impression is greatly controlled by limitations of vision and motion. As a traveler’s speed increases, larger aesthetic elements in a roadway corridor remain visible, while smaller elements and fine details become virtually invisible. Similarly, as distance from the roadway increases, a person’s ability to see small elements and fine details within a corridor are greatly diminished. Thus, the aesthetic guidelines presented in this chapter focus on the primary aesthetic elements within highway corridors, including (but not limited to) bridges, noise barriers, retaining walls, lighting, signage, and landscaping. Guidelines are also presented for primary aesthetic elements in local road corridors, including (but not limited to) traffic signals, sidewalks/buffers, and street lighting. For each of these primary aesthetic elements, this chapter contains:

- Background information and description of the aesthetic element
- ODOT design manual reference
- A description of ODOT’s baseline treatment(s)
- Example enhanced treatments
- Planning, design, and maintenance considerations
- Cost considerations (planning level)

This chapter also discusses aesthetic treatments for special project circumstances and environmental commitments. Supplemental aesthetic guidance documents are presented for designer and stakeholder review and consideration in Appendix C.

IMPORTANT: This is a guidance document, not a design manual. This chapter presents design concepts and images of aesthetic treatments that are consistent with acceptable design practices outlined ODOT’s design and construction manuals. This information is intended to help formulate an aesthetic treatment plan. ODOT’s design manuals are to be used to design the treatment plan. Designers should be aware that the attached reference documents (in Appendix C) are presented for informational purposes only and the aesthetic design concepts and images in those documents may not be fully consistent with ODOT design and construction specifications.

Additionally, this chapter provides an overview of ODOT’s baseline treatments, what baseline treatments look like, and when a designer may consider use of different available options within the baseline. It also provides an overview of typical enhancements that can be utilized, what they look like, and important factors that designers should consider when working with stakeholders and developing aesthetic treatment plans. As discussed in Chapter 2, baseline treatment details are included in ODOT’s design and construction manuals, with the goal of promoting uniform, safe, fundamentally sound, efficient, cost effective, and aesthetically appealing designs. Therefore, by nature, baseline treatments will be appropriate and applicable on most projects. However, in some circumstances, site constraints may require a deviation from the baseline. In these cases, and in cases involving a desire or need for enhanced treatments, the designer should address the change by communicating the issue or need with ODOT (and stakeholders, as applicable) and providing appropriate information and justification during the staged review process, using the tools and methods outlined in Chapter 3.
5.1 BRIDGE ELEMENTS

Bridges are a common and prominent structural element in all corridor types. Bridge design is a complex process, involving a number of components that comprise the superstructure and the substructure. Consideration of aesthetics on each component can result in a well-orchestrated and visually pleasing structure.

The visual appearance of a bridge is greatly influenced by horizontal lines created by superstructure elements, including railing, parapets, fencing, deck fascia, and beams/girders. Each of these elements can affect the appearance of the bridge as a whole and the appearance of the other contributing elements. Collectively, they define the most prominent visual aspect of the bridge. The design of the superstructure determines its visual slenderness. A proportionally slender superstructure is preferable from an aesthetic standpoint. With this in mind, techniques can be used to enhance the apparent slenderness of the superstructure. Such techniques include use of color to attract or detract attention, emphasizing horizontal lines, and contrasting the intensity of light and shadow on bridge elements.

The substructure provides the structural base for the bridge. Primary substructure elements include piers, pier caps, and abutments. Location and size of substructure units are important factors in a viewer’s perception of a bridge’s scale, proportion, and balance. Oversized or bulky substructure elements can make the overall bridge look disproportionate and divert attention away from the superstructure. Substructure elements that appear undersized or overly-slim can make the substructure appear weak and impart a feeling of instability.

The following sections provide additional aesthetic guidance for primary superstructure and substructure components, including: bridge railing, vandal fencing, deck fascia, girders, pier columns and caps, abutments, bridge drainage, and bridge lighting. This section also addresses general structure layout considerations.

5.1.1 Bridge Railing/Parapets

**ODOT Design Manual Reference:** Bridge Design Manual (BDM) 209.2 and 304

**Overview:**
Background Information: Bridge railing is a general term used by ODOT to collectively refer to the protective structure(s) along the edges of a bridge deck. Bridge railing includes parapets (protective concrete walls) and steel railing. ODOT uses three standard (baseline) railing systems for vehicular and pedestrian safety on bridge structures. Concrete Parapets: For overpass bridges with no sidewalks, non-overpass bridges on multi-lane roads and high volume two-lane roads, or where the finished deck surface is 25 feet or more above the ground line or water surface, ODOT uses a single-slope concrete parapet railing. See BDM 304.3.1, and Standard Bridge Drawing SBR-1-13 for additional guidance and specifications. Bridge Railing: For non-overpass bridges on low volume, rural two-lane roads where the deck surface is less than 25 feet above the ground or water, ODOT uses a steel twin-tube railing system. See BDM 304.3.3 and Standard Bridge Drawing TST-1-99 for additional guidance and specifications. Pedestrian Railing and Concrete Parapet: For bridges with sidewalks, ODOT uses a combination concrete parapet and steel twin-tube railing system. See BDM 304.3.5 and Standard Bridge Drawing BR-2-15 for additional guidance and specifications. Note: Rural/Urban definitions per ODOT L&D 101.2.

What This Section Covers: This section covers ODOT’s baseline treatments and enhanced aesthetic treatment examples for concrete parapet walls, pedestrian bridge railing, and other (non-pedestrian) bridge railing. Additional planning, design, and maintenance and cost considerations are also provided in this section. Vandal protection fencing is covered separately in Section 5.1.2.

Continued
Baseline Treatments:

**Baseline 1 (Concrete Parapets):** For interchange bridges (statewide) and non-interchange bridges in urban areas: 42" single-slope concrete parapet with: 1) two 1.5” x 0.75” equally-spaced horizontal grooves, or 2) dry stack, fractured fin, or ashlar block formliner pattern, and 3) light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778). For non-interchange bridges in rural areas: 42” single-slope concrete parapet with two 1.5” x 0.75” equally-spaced horizontal grooves and light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778). See Planning, Design, and Maintenance Consideration for additional information.

**Baseline 2 (Bridge Railing):** Galvanized twin-tube steel railing mounted on the side of the bridge deck (32” minimum height above the deck). Railing, posts, and hardware are unpainted (galvanized steel) or painted black. Note: This railing is not to be used where pedestrian/bike traffic is expected per BDM 304.3.3. Deep Beam Guardrail (DBR-2-73) is also an option for low volume, narrow bridges. See BDM 304.3.2 for guidance.
**Baseline 3 (Pedestrian Railing/Concrete Parapet):** 18” high galvanized twin-tube steel railing mounted on a 24” concrete parapet. The parapet is sealed with a light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778). For interchange bridges (statewide) requiring pedestrian railing, the railing, posts, and hardware are painted black. For all other bridges requiring pedestrian railing (rural or urban), the railing, posts, and hardware are unpainted (galvanized steel) or are painted black. This treatment (galvanized or black) should match vandal fencing where both are required.

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Baseline 3: Example of Black Twin-Tube Steel Railing on Sealed Concrete Parapet" /></td>
<td>Baseline 3: Example of Black Twin-Tube Steel Railing on Sealed Concrete Parapet</td>
</tr>
<tr>
<td><img src="image2.png" alt="Baseline 3: Example of Galvanized Twin-Tube Steel Railing on Sealed Concrete Parapet (with matching galvanized vandal protection fencing)" /></td>
<td>Baseline 3: Example of Galvanized Twin-Tube Steel Railing on Sealed Concrete Parapet (with matching galvanized vandal protection fencing)</td>
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**Enhanced Treatment Options:**
A wide range of decorative railing options are available for designer and stakeholder consideration when aesthetic enhancements are desired on a bridge project. Typically, decorative bridge railing is used in urban, suburban, and gateway corridors, particularly at gateway interchanges and gateway river crossings as alternatives to Baseline 1 (42” concrete parapet) and Baseline 3 (concrete parapet with steel tube railing). Although uncommon, decorative railing may also be appropriate for projects in rural, scenic corridors as enhancements for Baseline 2 (steel tube bridge railing). Several examples of decorative (enhanced) railing treatments that have been used on ODOT/LPA projects in Ohio are presented below. Each of these examples contains important visual design elements such as line, color, and texture, which improve the aesthetic design qualities of the bridge structures (as described in Chapter 4). Brief descriptions of applicable visual design elements and aesthetic design qualities are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
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<tbody>
<tr>
<td><img src="image3.png" alt="Enhancement Example (for Baseline 1): Salisbury Road at I-475, Toledo. This simple parapet wall enhancement consists of a dark gray color on the parapet situated between black vandal protection fencing and light neutral deck and girder fascia. This combination of contrasting combined with the dry stack pattern in the parapet, accentuate horizontal lines and provide texture, which draws attention to the superstructure." /></td>
<td>Enhancement Example (for Baseline 1): Salisbury Road at I-475, Toledo. This simple parapet wall enhancement consists of a dark gray color on the parapet situated between black vandal protection fencing and light neutral deck and girder fascia. This combination of contrasting combined with the dry stack pattern in the parapet, accentuate horizontal lines and provide texture, which draws attention to the superstructure.</td>
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<tr>
<td><img src="image4.png" alt="Enhancement Example (for Baseline 1): US 33 at I-270, Columbus. The aesthetic appeal of this bridge is bolstered by the contrasting colors and the unique texture of the parapet. The horizontal lines in the parapet give the superstructure a slender and proportional appearance." /></td>
<td>Enhancement Example (for Baseline 1): US 33 at I-270, Columbus. The aesthetic appeal of this bridge is bolstered by the contrasting colors and the unique texture of the parapet. The horizontal lines in the parapet give the superstructure a slender and proportional appearance.</td>
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Continued
Aesthetic Guidelines – Bridge Railing/Parapets

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** The superstructure is the aesthetic focal point of a bridge, and the bridge railing is an integral component of the superstructure. Thus, the primary aesthetic goal for the bridge railing is to draw a viewer’s attention to the superstructure and reinforce the appearance of proportion, order, and rhythm. As depicted in the example photographs above, this can be achieved by: 1) accentuating horizontal lines which give the perception of vertical slenderness, 2) incorporating subtle vertical elements to create rhythm, 3) using contrasting colors to heighten awareness and command attention, and 4) keeping designs simple and easy to distinguish at highway speeds.

- **Important Safety Requirement:** Decorative (enhanced) railing must meet safety requirements outlined in BDM 304. The design of all non-standard railing systems shall be compliant with AASHTO’s Manual for Assessing Safety Hardware (MASH, 2016). Designers may be required to submit crash report data to verify acceptability.

Continued
Optional Baseline Treatment Considerations: Per BDM 305.3.3, the concrete parapet/steel tube railing system (Baseline 3, BR-2-15) may be used without a sidewalk (if pedestrian traffic is not a concern). This may be desired on a bridge crossing with a unique or scenic viewshed, or as a special stakeholder request. Where vandal protection fencing is required, the steel tubing may be omitted if the concrete parapet height is 32” or greater. For Baseline 1, on multi-lane divided highways with twin bridges, the designer should determine if the faces of the parapets between the two bridges are visible to traffic. If not, the horizontal grooves (or formliner pattern) do not need to be constructed on the parapets between the bridges. Additionally, for bridges over streams, the designer should also determine if the outside parapet walls are visible to traffic, pedestrians, adjacent residential areas, or other areas of frequent human use (such as a park). If not, the horizontal grooves or formliner pattern do not need to be constructed.

Post Locations: Whenever possible, designers should arrange rail post locations such that parapet expansion joints are centered between the posts per standard drawing BR-2-15. Designers should also consider aligning rail post locations with vandal protection fence post locations whenever possible - as shown in this photograph (vandal protection fencing is discussed in Section 5.1.2). Coordinated post placement provides a sense of order and desirable aesthetic appearance.

Parapet Staining: Designers should consider the potential for parapet staining and related maintenance costs when using railing systems with unpainted components. Painting galvanized railing components a matching gray color adds another layer of protection to minimize staining (see Section 5.1.2 for additional information).

Vertical Railing Elements: Designers should consider the number and thickness of vertical elements when designing railing enhancements. Limiting vertical elements and accentuating horizontal elements promotes a slender superstructure appearance. Railing color should be coordinated with other bridge elements (such as vandal fencing, lighting, and fascia girder color) whenever possible to provide a unified appearance.

Formliner Patterns: Per BDM 209.7.1, if formliners are being used to incorporate patterns/textures into a parapet, the projections should be as deep as possible to achieve the desired visual effect. Using shallow depths (less than 0.5”), provides very little, if any, visual effect when viewed from a distance. Note: the depth of the formliner pattern is not to be included in the measurement of the concrete clear cover.

Red Paint/Sealers: In general, red paint or red-tinted sealers should be avoided whenever possible as this color historically does not perform well on concrete and steel surfaces (fading, discoloration). Per BDM 209.7.1, colored concrete, where the color is integral with the concrete mix, should not be used since the final visual appearance of the concrete is not uniform. The color varies greatly due to the aggregate, cement type, cement content and the curing of the concrete.

Graffiti: Though typically not a major problem on concrete parapets, in areas where concrete surfaces have a history of graffiti vandalism, the designer may add a permanent graffiti coating meeting the requirements of Supplement 1083 on top of the epoxy-urethane or non-epoxy sealer (per BDM 303.1). ODOT recommends treating all exposed wall areas, since there have been instances where soaker guns have been used to place graffiti on the top of walls.

Maintenance Considerations: Bridge railing and concrete parapets are typically replaced every 50 years, when superstructures are being rehabilitated or replaced. Within that timeframe, painted steel bridge railing will likely require maintenance (repainting or touch-ups) every 10 to 15 years for aesthetic purposes and to minimize rust and discoloration. Dark colors may require more maintenance than lighter colors due to more visible chipping. Resealing the outside face of concrete parapets will likely be necessary every 20 years. Resealing the inside face of concrete parapets (traffic side) may be necessary every 5 to 10 years due to salt spray and damage from debris and vehicular crashes. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for baseline and enhanced treatments, including bridge railing.

Continued
Cost Considerations (Base Year 2017):

The construction cost for Baseline 1 (42” concrete parapet with light neutral sealer) ranges from approximately $130 per linear foot (concrete parapet with light neutral sealer and horizontal grooves) to approximately $165 per linear foot with light neutral sealer and dry stack, fractured fin, or ashlar block formliner pattern. There is typically no additional cost for applying different colored epoxy-urethane or non-epoxy sealers.

The construction cost for Baseline 2 (galvanized steel tube bridge railing, unpainted) is approximately $140 per linear foot. Painting the steel tube bridge railing increases the cost to approximately $180 per linear foot.

The construction cost for Baseline 3 (concrete parapet with light neutral sealer and unpainted galvanized steel tube railing) is approximately $210 per linear foot. Painting the steel tube railing increases the cost to approximately $250 per linear foot. Adding a decorative formliner pattern to the concrete parapet as an enhancement increases the cost to approximately $280 per linear foot, though this cost can vary depending on formliner complexity. A decorative, painted, and crash-tested enhanced bridge railing (similar to the examples provided on the previous page) is approximately $300 per linear foot.

Repainting baseline steel bridge railing costs approximately $40 per linear foot. Repainting decorative bridge railing can cost two to three times that amount, depending on design complexity. Resealing concrete elements costs approximately $3 per square foot.

Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.

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5.1.2 Vandal Protection Fencing

ODOT Design Manual Reference:  [Bridge Design Manual](#) (BDM) 305

Overview:
Background Information: Vandal protection fencing is used on many ODOT bridges over highways and railroads to discourage the throwing or dropping of objects from bridges and to provide security for pedestrians and vehicles. Fencing is installed on bridge overpasses (over vehicular traffic) except as noted in the BDM. Bridges that carry vehicular traffic over county/township routes are exempt from fencing. For existing bridges, fencing is provided when new concrete or refaced concrete barriers are installed. Fence heights and configurations for bridges with sidewalks, bridges without sidewalks, and pedestrian bridges are included in the BDM. See BDM 305.2 through BDM 305.5 and [Standard Bridge Drawing](#) VPF-1-90 for additional guidance and specifications.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for vandal protection fencing. Additional planning, design, maintenance, and cost considerations are also provided in this section. Bridge railing is covered separately in Section 5.1.1.

Baseline Treatments:
Galvanized chain-link wire fabric with 1” diamonds and PVC coating. For interchange bridges (statewide) where vandal fencing is required, the PVC coating is black and the posts, railing, and hardware are painted black.

For all other bridges (statewide) where vandal fencing is required, the PVC coating is gray and the posts, railing, and hardware are unpainted (galvanized steel) or the PVC coating is black and the posts, railing, and hardware are painted black. This treatment (galvanized or black) should match pedestrian railing where both are required.
Enhanced Treatment Options:
Decorative vandal protection fencing is often used as an aesthetic enhancement on bridge projects in urban, suburban, and gateway corridors, and should not be confused with decorative bridge railing (see Section 5.1.1), which is occasionally used as an aesthetic enhancement on bridge projects when protection fencing is not required. A variety of decorative protection fence options are available to designers when special enhancements are desired on a bridge project. Alternative color options (in addition to black and galvanized/gray) are also available as enhanced treatments. Procedures for using special fence designs are described in BDM 305.4. Several examples of decorative vandal protection fencing that have been used on ODOT/LPA projects in Ohio are presented below. Each of these examples contains important visual design elements such as line, color, and texture, which improve the aesthetic design qualities of bridge structures (as described in Chapter 4). Brief descriptions of applicable visual design elements and aesthetic design qualities are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

Enhancement Example: Liberty Way at I-75, Butler County. The black color of this decorative fence (with protective wire fabric) was coordinated with the black girders and together contrast to the light-neutral parapet and deck fascia. Though numerous, the thin vertical elements of the fence provide rhythm but do not overpower the horizontal elements. The combined effect is a simple but visually appealing design which draws attention to the superstructure.

Enhancement Example: SR 741 at I-71 in Warren County. This photograph provides a closeup view of an aesthetically appealing decorative vandal fence (with protective wire fabric). An aesthetic benefit of this type of decorative fence is the strong horizontal lines created by the fence rails. The diamond shape in the center provides an artistic element and helps create rhythm when the entire structure is viewed from a distance.

Enhancement Example: ProMedica Parkway at I-475, Toledo. This unique example of decorative vandal fencing consists of continuously-curved posts combined with a tight black wire fabric, which not only provides an appealing aesthetic appearance, but also added safety protection (from the curved fence). This is also a good example of creating strong color contrast using a light-neutral parapet between the black fence and the dark brown girders.

Enhancement Example: Ikea Way at I-71, near Columbus. This decorative vandal fence example is similar to the Liberty Way example above, but with a vibrant blue color that was coordinated to match the blue girder color. Note how the coordinated blue colors blend with the blue sky in the background but provide visual contrast to the light-neutral parapet and deck fascia, which draws attention to the superstructure.

Continued
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** The primary aesthetic goal for vandal fencing is to visually compliment (or contrast) other superstructure elements and help draw a viewer’s attention to the superstructure. Color, line, rhythm, and contrast are key aesthetic design elements and qualities to accentuate. Designers should avoid fence styles with numerous, thick vertical elements or are visually too complex to distinguish at highway speeds. Designers should avoid and bright colors that are distracting, and consider utilizing dark-neutral colors that contrast light-neutral concrete elements.

- **Safety Consideration:** Many decorative fence styles consist of welded panels (as opposed to the baseline chain-link wire fabric that is manufactured as a fabric roll). Although uncommon, it is possible for a decorative fence panel to become dislodged and fall as a result of a vehicular crash. When designing decorative fence enhancements with such panels, designers should consider tethering multiple panels together to reduce the chance of a panel falling during a crash. The tethers should match the color of the decorative fencing for aesthetic purposes.

- **Post Locations:** Guidelines and specifications for placement of fence posts are included in BDM 305.3 and VPF-1-90. Designers should align fence post locations with pedestrian railing post locations whenever possible (see also Section 5.1.1). *Coordinated post placement provides a more desirable, ordered aesthetic appearance, as shown in this photograph.* Whenever possible, designers should arrange post locations such that parapet joints are centered (approximately) between fence posts.

- **Color Coordination:** Decorative vandal protection fence color should be coordinated with other bridge elements whenever possible to provide a unified appearance. ODOT provides a range of colors that are acceptable for special fence designs (see BDM 305.4). As illustrated in the example photographs on the previous page, black provides a bold and appealing contrasting color that can be used in almost any setting. Darker shades of green, brown, blue, and gray colors compliment natural backgrounds (sky, vegetation) and contrast light-neutral concrete elements.

- **Bridge Staining:** Galvanized steel (unpainted posts with gray PVC fence fabric) is a baseline treatment for vandal protection fencing. Designers should ensure that galvanized steel is specified in the plans to avoid *significant rust, discoloration, and bridge staining, as shown in this photograph.* Though galvanized steel typically does not rust in this manner, discoloration and bridge staining still may occur, particularly on light-neutral parapet walls. Designers may consider applying a coat of gray paint to vandal protection fence posts and hardware to help minimize discoloration and staining.

- **Vertical Fence Elements:** Overuse of vertical fence elements can make a superstructure appear bulky. Designers should consider the number and thickness of vertical fence elements when utilizing decorative vandal protective fencing. Limiting the number and/or thickness of vertical fence elements and accentuating horizontal rails promotes a slender, aesthetically appealing appearance for the superstructure.

- **Maintenance Considerations:** ODOT typically replaces vandal protection fencing every 50 years, when superstructures are being rehabilitated or replaced. Within that timeframe, vandal protection fencing will likely require maintenance (post and hardware repainting or touch-ups) every 10 to 15 years for aesthetic purposes and to minimize rust and discoloration. Black and other dark colors will typically require more maintenance than light colors due to more visible chipping. *Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for baseline and enhanced treatments, including bridge railing.*

Continued
### Cost Considerations (Base Year 2017):

The construction cost for baseline gray PVC coated vandal protection fencing with unpainted galvanized posts, rails, and hardware is approximately $90 per linear foot. The construction cost for baseline black PVC coated vandal protective fencing with painted posts, rails, and hardware is approximately $120 per linear foot.

Decorative (enhanced) vandal protection fencing similar to the examples provided on the previous page cost approximately $120 to $200 per linear foot, depending on design complexity.

Repainting baseline vandal protection fencing (painted post and hardware components only) costs approximately $15 per square foot. Repainting decorative fencing (all components) can cost $80 to $100 per linear foot.

*Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.*
### 5.1.3 Bridge Deck Fascia and Beams/Girders

**ODOT Design Manual Reference:** [Bridge Design Manual](#) (BDM) 205 and 302; [Construction and Material Specifications](#) (CMS) Items 512 and 708.

**Overview:**

**Background Information:** The deck provides the driving surface for a bridge. Most bridge decks in Ohio consist of a concrete slab. Slab thickness is variable and is calculated per BDM 302.2.1, though typical highway overpass bridges have a 6” to 9.5” thick slab, which makes it a noticeable structural element for travelers approaching a bridge. Concrete parapets (see Section 5.1.1) are anchored to the outside edge of the deck slab. Beams and girders provide the structural support on which the deck slab rests. Most ODOT bridges use prestressed concrete box beams, prestressed concrete I-beams, rolled steel beams, or constant depth steel girders. The type of beam or girder used on a specific bridge is based primarily on span length and cost. Prestressed concrete and rolled steel beams are typically used on shorter spans (less than 100’). See BDM 205 and BDM 302 for additional guidance and specifications for deck slabs, beams, and girders. Beams, girders and deck fascia are important aesthetic elements as they comprise about half of the visible superstructure for approaching travelers. Aesthetic treatments (particularly painting/sealing color) applied to these elements and parapet walls (see Section 5.1.1) are instrumental in providing a unified look throughout Ohio.

**What This Section Covers:** This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for concrete deck fascia and bridge beams/girders. Additional planning, design, maintenance, and cost considerations are also provided in this section.

**Baseline Treatments:**

**Deck Fascia:** Provide deck slab overhang per BDM 205.6. Seal the concrete deck fascia with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778). Seal underneath the overhang from the deck fascia to the fascia beam. **Note:** The vertical sides and 6” on the underside of concrete slab bridges are also sealed.

**Beams/Girders:** For new bridges or superstructure rebuilds, use coated steel beams/girders and paint per CMS Item 708.01 and CMS Item 708.02. Color selection will be made by the ODOT Project Manager (FS-595C-10324 – light brown, FS-595C-14277 – light green, or FS-595C-15526 – light blue per CMS Item 708.02).

For bridges in sensitive areas (such as parks) or where maintenance may be difficult (railroad bridges, bridges over water, tall bridges), use uncoated weathering steel beams/girders. Paint the last 10 feet of each beam/girder and above each pier a matching dark brown color (Federal Color 20059) to prevent staining. Metallized or galvanized steel beams/girders are also options in these situations (see Planning, Design, and Maintenance Considerations).

If prestressed concrete box beams or prestressed concrete I-beams are determined by the design team to be more economical than steel on a specific project, seal the fascia beams with a light brown, light green, or light blue epoxy-urethane or tinted non-epoxy sealer (the same federal colors as listed above for steel).

For superstructure rehabilitation projects involving previously-painted steel or previously-sealed prestressed concrete beams/girders, repaint or reseal to match the existing color scheme.
Enhanced Treatment Options: Enhancement options for deck fascia are fairly limited. Since the deck fascia is not a large structural element and the parapet is already offset 2” in the baseline design per Standard Bridge Drawing BR-2-15, it is impractical (and unnecessary) to apply formliners to just the deck fascia to create patterns and texture. However, formliners can be applied to the larger parapet fascia (as discussed in Section 5.1.1), or to the parapet fascia and deck fascia simultaneously to create the illusion of a single structural element (see example photographs below). A variety of colored sealer options are available to provide the desired tint to deck/parapet fascia. Enhancement options for beams and girders typically involve painting with an alternative (non-baseline) color to introduce or accentuate color contrast, or to match a broader aesthetic theme for the bridge or the corridor. In rare circumstances, an alternative girder style (haunched) or treatments that mimic haunched girders can be used as an enhancement (see the Planning, Design, and Maintenance Considerations section for additional information). Several examples of enhanced treatments that have been used on ODOT/LPA projects in Ohio are presented below. Brief descriptions of applicable visual design elements and aesthetic design qualities are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

Enhancement Example: I-75 at Martin Luther King Drive, Cincinnati. This design utilizes dark green painted steel girders (bottom arrow), a strong deck overhang (top arrow), black vandal fencing, and a decorative parapet design to create an appealing enhancement. This design uses pattern, color contrast, and light/shadow contrast to draw attention to the superstructure.

Enhancement Example: SR 41 Over the Great Miami River, Troy. In this example, the vibrant blue painted steel girder (bottom arrow), the light-neutral concrete sealer on the deck fascia and parapet (top arrow), and the dark gray decorative railing provide visually appealing contrasts and strong horizontal lines on the superstructure. The shadow line on the blue girder (created by the deck overhang) adds an additional horizontal line to superstructure.
Aesthetic Guidelines – Bridge Deck Fascia and Beams/Girders

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** The primary aesthetic goal for the deck fascia is to provide subtle form, line, and shape elements to the superstructure primarily through overhang and shadow, and in some circumstances patterns and colors. The primary aesthetic goal with respect to beams and girders is to accentuate horizontal lines and color elements (typically through color contrast). The intent is for these aesthetic elements to create the perception of a proportional and slender superstructure, and to make the superstructure the focal point of the bridge.

- **Enhanced Color Considerations:** For enhanced treatments, designers should consider using beam/girder paint or sealer colors that contrast deck/parapet fascia colors, but match or compliment bridge railing/fence colors. In corridors where weathering steel bridges are already present (see baseline treatments), consider painting or sealing fascia beams with a matching color for corridor unity. When prestressed concrete beams are used, seal the visible portion of the fascia beam with the desired color (using an epoxy-urethane or tinted non-epoxy sealer). When coated steel is used, paint all steel surfaces. If dark paint is used on the fascia beam (dark brown, dark blue, dark green, or black), paint the interior steel members a light neutral color to facilitate inspections.

*Continued*
Weathering Steel Color Considerations: Designers should consider color variations that occur with unpainted weathering steel. New weathering steel has a dark brown appearance. As a weathering occurs, the steel often turns to a rust/orange color. This color change is accentuated by light and shadow. Designers should consider the orientation of the bridge and the amount of direct sunlight received and be aware that a matching brown paint applied during construction may not match a few years after construction, as illustrated in this example photograph. Repainting may be required to maintain an appealing appearance.

Galvanized and Metallized Beams/Girders: Galvanized or metallized beams/girders are uncommon but can be used as the baseline treatment in certain situations (similar to weather steel, as described on Page 5-12). Galvanizing and metallizing are different processes. Metallizing involves spraying a coating of molten metal (usually zinc) onto the steel beam/girder to form a mechanical bond between the zinc and the surface of the steel. Galvanizing is a total immersion process where the steel element is dipped into a bath of molten zinc. Galvanizing metallurgically bonds the zinc to the steel substrate making it a part of the steel. Designers should coordinate with ODOT district and/or Office of Structural Engineering staff if use of either of these types of beams/girders is being considered.

Deck Overhang: Per BDM 205.6 deck overhang should be 2/3 of the beam/girder depth but should not exceed greater than 4’0”. Designers should be aware the recommended overhang is a design and aesthetic target and may not be practical for bridges with haunched girders, curved bridges, or other special bridge types.

Beam/Girder Depth: Per BDM 209.7, abrupt changes in beam/girder depth should be avoided where possible. Per BDM 302.4 and BDM 302.5, beam/girder depth should be consistent for the length of the bridge whenever possible. From an aesthetic standpoint, preferred span length to girder depth ratios range from 20:1 to 30:1 (also known as the slenderness ratio - see also Section 5.1.8). This example photograph shows a highway bridge (I-74 in Cincinnati) with a slenderness ratio near 10:1. These deep girders are not proportional to the rest of the structure, giving the bridge a bulky and unappealing appearance.

Haunched Girder Treatments: Per BDM 205.6, haunched girders are typically considered for long-span bridges (spans over 350’), or as structural needs and economics warrant their use. Though the haunched girder shape does provide an appealing aesthetic element to a bridge, this girder type is not often used as an aesthetic enhancement due to high cost. An alternative treatment is available that can give a bridge the appearance of haunched girders, however. This treatment involves placing shaped precast concrete panels over a bridge’s fascia girder that give the appearance of haunched girders or concrete arch spans (see the Monument Avenue/Great Miami River photograph in the previous section as an example).

Red Paint/Sealers: Red paint or red-tinted sealers should be avoided whenever possible as this color historically does not perform well on concrete and steel surfaces (fading, discoloration). Per BDM 209.7.1, colored concrete, where the color is integral with the concrete mix, should not be used since the final visual appearance of the concrete is not uniform. The color varies greatly due to the aggregate, cement type, cement content and the curing of the concrete.

Maintenance Considerations: Concrete and steel beams/girders are typically replaced every 50 to 75 years in conjunction with full bridge rebuilds or superstructure replacement projects. Concrete decks typically have a 50-year lifespan. Painted ends of weathering steel beams/girders may need repainting within five years after construction to match the color of the steel after the weathering process. Otherwise, painted steel beams/girders typically need repainted every 25 years. Prestressed concrete beams and concrete deck fascia are typically resealed every 20 years. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for baseline and enhanced treatments, including bridge deck fascia and beams/girders.
Cost Considerations (Base Year 2017):
Beams and girders are major cost drivers for bridges and vary in cost based on type and size. The approximate cost for uncoated weathering steel beams/girders (with painted ends and areas over pier caps) typically range from $300 to $800 per linear foot. Fully painted steel beams/girders typically range from $350 to $900 per linear foot. Prestressed concrete beams/girders (with sealer) typically range from $150 to $600 per linear foot. Haunched steel girders (painted) typically range from $400 to $1,000 per linear foot. Shaped precast concrete fascia panels that mimic haunched girders cost approximately $600 per linear foot. Contact ODOT for costs associated with galvanized or metallized beams/girders.

Deck fascia overhang is controlled by beam/girder arrangement. There is no specific cost involved with deck overhang unless associated beam/girder adjustments result in the placement of additional members. See Section 5.1.1 for costs associated with adding a formliner to a concrete parapet fascia. There is typically no additional cost for utilizing different colored epoxy-urethane or tinted non-epoxy sealers.

Repainting steel beams/girders is approximately $15 per square foot. Resealing prestressed concrete beams/girders with an epoxy-urethane or non-epoxy sealer is approximately $3 per square foot.

Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.1.4 Bridge Piers

ODOT Design Manual Reference: Bridge Design Manual (BDM) 204.5 and 303.3

Overview:
Background Information: The term “pier” is used to refer to the collective system of vertical columns and horizontal caps (if applicable) that help support the superstructure. For highway overpasses, ODOT generally uses concrete cap-and-column piers supported on a minimum of three columns. ODOT also occasionally uses T-type piers for highway overpasses. For stream and small river crossings, ODOT generally uses capped pile-type piers (which are visually similar to cap-and-column piers) or T-type piers, though ODOT discourages T-type piers on low bridges with debris flow problems and where pier access is limited. For larger river crossings, ODOT typically uses solid wall type piers. See BDM 204.5 and BDM 303.3 for additional guidance and specifications.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for highway and river crossing bridge piers. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Highway Overpass Bridges: Cap-and-column pier style using 36” diameter (minimum) round concrete pier columns and cantilevered concrete pier caps with rounded ends. The bottom of the cantilevered end is beveled (sloped upward). The width of pier cap is 4” greater than the diameter of the pier columns (minimum). Caps and columns are sealed with a light-neutral epoxy-urethane or tinted non-epoxy tinted sealer (Federal Color 17778). See Planning, Design, and Maintenance Considerations section for additional discussion regarding pier sealing.

Waterway Bridges: Capped pile (concrete or encased steel piles), cap-and-column, T-type, or solid wall concrete piers per BDM 204.5 and BDM 303.3. Concrete elements are sealed with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778). Note: Polyethylene pile encasements are needed for low pH waters.
Aesthetic enhancements and special designs for bridge piers are typically used on gateway interchange projects, major urban bridge projects, and major river crossing projects. Enhancements can range from basic formliner patterns on cap-and-column piers and solid wall piers to extravagant pier styles with aesthetic or structural elements that resemble cap-and-column, T-type, solid wall, or V-type piers (or combinations of these pier types). A variety of colors can be used to match or contrast color schemes used on the superstructure. Since special pier designs on large urban and river crossing projects can add substantial cost and design complexity, it is important for designers to coordinate special pier designs with ODOT early in the design process, consult the BDM for design guidance and specifications, and follow the aesthetic design process outlined in Chapter 3. Several examples of special pier designs and decorative treatments that have been used on ODOT/LPA projects in Ohio are presented below. Brief descriptions of applicable visual design elements and aesthetic design qualities (as described in Chapter 4) are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

**Enhancement Example: I-475/US 20 Interchange, Toledo.**
This is an example of an aesthetic enhancement for the baseline cap-and-column pier type for highway overpasses. A stone block formliner pattern was applied to square caps and columns. A tan sealer was used on the stone pattern to match the color of the parapets and abutments (not shown) but contrast the green girder color and the darker tan accent color used on the pier cap and deck fascia trim.

**Enhancement Example: I-670/I-71 Interchange, Columbus.**
This is an example of a T-type pier design with a basic decorative formliner pattern. This repetitive pier shape and simple and consistent formliner pattern, juxtaposed against the continuous slender girders, provide rhythm and give this bridge an ordered and harmonious appearance.

**Enhancement Example: I-90 Innerbelt, Cleveland.**
This is a unique pier style that combines aesthetic and structural elements of a cap-and-column pier and a T-type pier. In this example, the entire substructure and superstructure are a light-neutral color. This monotone color design works in this particular example due to the vertical elevation of the bridge and the stylistic shape of its substructure and superstructure components.

**Enhancement Example: I-75 Over the Great Miami River, Dayton.**
This is a simple, appealing aesthetic enhancement for the baseline solid wall pier. A horizontally grooved formliner was applied to all surfaces, which provide texture and relief to this massive concrete pier. A rust colored sealer was applied to a portion of each pier face, which matches the bold, rust-colored fascia beam.

Continued
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary**: For typical highway overpass bridges, the primary aesthetic goal for piers is to avoid overly large or visually awkward caps and columns, avoid disruption of the bridge’s horizontal visual emphasis, and avoid becoming the visual focal point of the bridge. However, for large-scale highway overpass bridges and river crossings, the visual focus of the bridge often includes the piers, due to their inherent size and, for river crossings, direct interaction with the water surface. For these structures, the goal is to provide visually appealing and complimentary shape without being distracting or out of proportion with the rest of the bridge.

- **Additional Pier Sealing Guidance**: In some situations, sealing bridge piers is not needed (piers that are not exposed to salt/deicing spray) or can be difficult to maintain (sealed piers in stream/river channels). Pier sealing should be performed in accordance with BDM 303.1 and ODOT District scouring recommendations. In general, piers should be sealed if exposed to salt/deicing spray or are highly visible to traffic/pedestrians. In cases where piers in river/stream channels are highly visible and have been sealed for aesthetic purposes, sealer maintenance should be performed during a low-flow period.
Pier Column Width: From an aesthetic standpoint, a pier column width that is greater than the height of the superstructure divided by four (but less than the height of the superstructure divided by two), is preferable.

Number of Pier Columns: Designers should consider minimizing the number of pier columns to the extent possible, which improves aesthetics by simplifying the visual appearance and mass of the substructure. However, per BDM 204.5, cap-and-column piers types should utilize a minimum of three columns, for structural and safety purposes. This provision reduces the potential for total pier failure in the event of an impact involving a large vehicle.

Short and Tall Piers: Short piers (width is greater than height) are challenging from an aesthetics standpoint because the cap is often large and visually clumsy in relation to the total pier. Tall piers (height greater than width) benefit from simplicity, fewer lines, and slender proportions. To the extent possible, designers should consider the following to help achieve the aesthetic design goals for highway overpass piers: 1) minimizing the height of pier caps, 2) minimizing the number of columns, 3) avoiding enhanced surface treatments that are small and complex and difficult to view at highway speeds, 4) coordinating enhanced surface treatments (colors, patterns) with superstructure elements, 5) adjusting column width or changing column styles, 6) tapering tall T-type pier shafts.

Additional Aesthetic Design Guidance: Per BDM 209.7.1, designers should generally avoid designing slender superstructures over massive piers. For large bridges, basic pier designs with simple but well-defined patterns and subtle color contrasts are often the most appealing from an aesthetic standpoint. Extravagant designs with large structural elements, complex patterns, and bold colors can make piers look massive and disproportionate, which can detract from the aesthetic qualities of the overall setting. This is particularly relevant on major river crossings where the river itself and the adjacent riverfront areas are also important aesthetic elements. The absence of patterns and colors can have a similar negative effect. Large monotone structures lacking texture and contrast often look bulky and ordinary.

Piers in Stream/River Channels: Per BDM 205.2, an odd number of spans is typically desired for stream/river crossings, with an overall goal of not having a pier located directly in the center of the channel. Per BDM 303.3.2.10, piers in the navigation channel of waterways, unless protected from collision by an adequate fendering system, shall be designed to resist collision forces based on AASHTO's Guide Specification for Vessel Collision Design of Highway Bridges.

Formliner Patterns: Per BDM 209.7.1, if formliners are being used to incorporate patterns/textures into a bridge pier, the projections should be as deep as possible to achieve the desired visual effect. Using shallow depths (less than 0.5"), provides very little, if any, visual effect when viewed from a distance. The depth of the formliner pattern is not to be included in the measurement of the concrete cover.

Red Paint/Sealers: Red paint (as shown in this example photograph) or red-tinted sealers should be avoided whenever possible as this color historically does not perform well on concrete and steel surfaces (fading, discoloration). Per BDM 209.7.1, colored concrete, where the color is integral with the concrete mix, should not be used since the final visual appearance of the concrete is not uniform. The color varies greatly due to the aggregate, cement type, cement content and the curing of the concrete.

Graffiti: Per BDM 303.1, in areas where concrete surfaces have a history of graffiti vandalism, the designer may add a permanent graffiti coating meeting the requirements of Supplement 1083 on top of the epoxy-urethane or non-epoxy sealer. ODOT recommends treating all exposed wall areas, since there have been instances where soaker guns have been used to place graffiti on the top of walls.

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> **Maintenance Considerations:** Similar to concrete abutments, bridge piers have long lifespans and are typically replaced every 75 to 100 years as part of a full bridge replacement project. Piers sealed with a light neutral epoxy-urethane or non-epoxy sealer will typically require resealing every 20 years. When piers are located in close proximity to the highway shoulder, they are susceptible to damage from stones, debris, and salt spray, resealing may be necessary every 5 to 10 years. *Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for baseline and enhanced treatments, including bridge piers.*

**Cost Considerations (Base Year 2017):**
The construction cost for baseline cap-and-column, capped pile, and T-Type piers is based on a number of factors, including footing complexity, number of columns, column height, column thickness, and cap thickness. Replacing round columns with square columns and adding a decorative formliner patterns as an enhancement increases the cost by approximately 50 percent. Adding formliner patterns to large T-type piers increases the cost by about 10 percent. There is typically no additional cost for utilizing different colored epoxy-urethane or non-epoxy sealers.

The construction cost for baseline solid wall river piers is also based on footing complexity and wall height, length, and thickness. Depending on the complexity of the formliners, adding decorative shapes or patterns to a solid river pier (similar to the examples on the previous page), increases the construction cost of the pier by approximately 10 to 20 percent. The costs for special enhanced pier designs similar to the US 40/Broad Street and Stewart Street bridge examples on the previous page are substantial and can range from 50 to 100 percent higher than a standard solid wall pier. Resealing piers and pier caps costs approximately $3 per square foot.

*Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.*

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5.1.5 Bridge Abutments

ODOT Design Manual Reference: [Bridge Design Manual](BDM) 204, 205, 209, and 303.

Overview:
Background Information: Abutments are the structural elements that anchor the ends of the superstructure and visually define the start and end of the bridge. Depending on the setting, abutments can be prominent visual elements, or be relatively invisible. Per BDM 205.2, ODOT generally prefers two-span bridges with stub abutments and spill-through slopes for overpasses over divided highways, though decisions on span arrangement and abutment design are controlled by complex site and cost factors. Per BDM 204.3 and BDM 204.4, when site conditions are appropriate, the use of wall-type abutments is acceptable to shorten bridge spans and reduce or eliminate embankment slopes. Partial height abutments are similar to stub abutments, but with slightly larger walls. Stub abutments on Mechanically Stabilized Earth (MSE) walls have become increasingly common and have replaced full-height abutments in many applications. Full-height abutments are typically used in urban corridors or major interchanges in depressed roadway/cut situations or where there are critical right-of-way limitations.

What This Section Covers: This section describes ODOT’s baseline for bridge abutments and enhanced aesthetic treatment examples (primarily surface treatments - such as colors, textures, and logos/pictographs). Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
**Stub Abutments (or Partial-Height Wall Abutments) with Spill-Through Slopes:** Seal concrete surfaces with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778). Do not apply formliners. Protect the surface of the spill-through embankment slope per BDM 209.4.

**Stub Abutments on MSE Wall:** Apply an ashlar block, dry stack, or fractured fin formliner to the MSE wall panels. Seal all concrete surfaces with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778).

Continued
Full-Height Wall Abutments: Apply an ashlar block, dry stack, or fractured fin formliner to concrete abutment walls and wing walls. Seal all concrete surfaces with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778).

Enhanced Treatment Options:
Aesthetic enhancements on bridge abutments primarily involve special patterns, logos, and pictographs (through use of formliners), and alternative sealer colors. These treatments are typically used in urban, suburban, and gateway corridors and applied to full-height abutments or MSE walls that are supporting stub abutments. Since stub abutments and most partial-height wall abutments with spill-through slopes typically have small visible concrete elements and are further removed from a traveler’s cone of vision, aesthetic enhancements are rarely applied to this type of bridge abutment. A wide range of colors and patterns can be used to match (or contrast) treatments applied to other bridge elements. Logos and pictographs are also discussed in Sections 5.2.3 and 5.2.6. Several examples of decorative treatments that have been used on bridge abutments on ODOT/LPA projects in Ohio are presented below. Brief descriptions of visual design elements and aesthetic design qualities are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** The shorter the bridge length, the more prominent the abutments will typically appear. Similar to piers and pier caps, the aesthetic goal for abutments on short bridges is to avoid overly-large or visually awkward structural elements, avoid disruption of the bridge’s horizontal visual emphasis (particularly the superstructure), and avoid becoming the visual focal point of the bridge. The longer the bridge length, the less prominent the abutments will appear. The aesthetic goal for abutments on long bridges is to firmly establish visual end points and avoid the appearance of structural weakness.

- **Stream and River Crossings:** Bridge crossings over streams and rivers typically have stub abutments or partial height wall abutments with spill-through slopes. These abutments are not readily visible and are not prominent structural elements from an aesthetic standpoint. Aesthetic enhancements are generally not recommended for these structural elements.
Bridges Over Multi-Lane Highways: ODOT generally prefers two-span bridges with stub abutments and spill-through slopes for overpasses over divided highways (per BDM 205.2). However, in some cases this is difficult to achieve due to skews and clearance requirements, and many of ODOT’s older bridges over divided highways are four-span structures with stub abutments or partial-height abutment walls and spill-through slopes. For most of these structures, the concrete abutments are generally small and located outside a traveler’s cone of vision at highway speeds. Aesthetic enhancements (formliners) are not recommended for these structural elements.

Bridges Over Side Roads: Highway overpass bridges over two-lane and three-lane roads are typically one-span or three-span structures with stub abutments or partial-height abutments with spill-through slopes (as shown in this photograph of US 30 bridges over US 68 in Hancock County). Aesthetic enhancements generally should not be applied to these abutments. Some highway overpass bridges over side roads have stub abutments with MSE walls. Designers may consider aesthetic enhancements for these structures as warranted.

Curtain Walls: Abutment wing walls generally look best when aligned at a 90-degree angle to the abutment face (as shown in this photograph of SR 161 bridges over Beech Road) or 180-degrees to the abutment face (as shown in the photograph directly above). Some ODOT bridges are designed with “curtain walls” to conceal bearing assemblies where the girders are supported by the abutments (yellow arrow). This technique can simplify the appearance of the bridge from an aesthetics standpoint, though the design preference is to avoid curtain walls to promote movement of air around the bearings.

Spill-Through Slopes: Per BDM 204.2, spill-through slopes should be 2:1, except where soil analyses dictate flatter slopes. Benches shall not be used at the face of abutments.

Coordinating Treatments: When designing aesthetic enhancements for abutment walls, designers should use colors/textures that are consistent with treatments used on other concrete elements on the bridge (such as the parapet wall and adjacent retaining walls) but consider using contrasting colors for girders and vandal fencing (or decorative bridge railing).

Concrete Cover Requirements: Per BDM 303.2.2.1, for alternative formliners used as aesthetic enhancements, minimum cover requirements for reinforcing steel must be met. If a formliner is used, minimum concrete cover shall not be violated by patterns or indents of the formliner. This will require additional concrete and, in some cases, dimensional changes.
Graffiti: Per BDM 303.1, in areas where concrete surfaces have a history of graffiti vandalism, the designer may add a permanent graffiti coating meeting the requirements of Supplement 1083 on top of the epoxy-urethane or non-epoxy sealer. ODOT recommends treating all exposed wall areas, since there have been instances where soaker guns have been used to place graffiti on the top of walls.

Preferred Aesthetic Design Ratios: From an aesthetic standpoint, the following abutment ratios are preferred:
- **Stub Abutment**: Face height greater than the girder depth divided by two.
- **Partial-Height Abutment**: Face height that is greater than the girder depth, but less than one-half of the vertical clearance height of the bridge.
- **Full-Height Abutment**: Face height equal to the vertical clearance height of the bridge (see also Section 5.1.8).

Maintenance Considerations: Concrete abutments (and MSE walls) have long life spans and are typically replaced every 75 to 100 years as part of a full bridge replacement project. Abutments sealed with a light neutral epoxy-urethane or non-epoxy sealer will typically require resealing every 20 years. When abutment walls are located in close proximity to the highway shoulder, they are susceptible to damage from stones, debris, and salt spray, and resealing may be necessary every 5 to 10 years. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for baseline and enhanced treatments, including bridge abutments.

Cost Considerations (Base Year 2017):
The construction cost for a baseline stub abutment or partial-height abutment with sealer ranges from about 5 percent to 20 percent of the overall cost of the bridge structure. Formliners generally are not applied to these abutment types. The cost of a stub abutment (with MSE wall) or a full-height abutment with sealer and basic formliner pattern is typically about 25 percent of the overall cost of the bridge structure but is usually partially offset by shorter bridge spans and/or a reduced number of bridge spans. Decorative enhancements applied to MSE walls and full height abutments involving special formliners increase the cost by less than 5 percent in most cases. There is typically no additional cost for use of different colored sealers. Resealing abutment walls costs approximately $3 per square foot.

Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.

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5.1.6 Bridge Drainage (Scuppers)


Overview:
Background Information: There are three general types of bridge drainage techniques: 1) over-the-edge, 2) off-the-end, and 3) scupper/pipe collection systems. The over-the-edge drainage technique allows water to flow off the sides of the bridge deck to the ground below (not permissible on highway overpasses). The off-the-end technique allows water to flow to the ends of the bridge and where it is then routed away from the bridge via a surface drainage or a subsurface storm water system. Scuppers are small openings along the edges of the bridge deck to drain water when other drainage types are not feasible. Scupper systems either utilize a short vertical pipe on each scupper to transport drainage through the superstructure and then allow the water to fall to the ground below, or use a collection system consisting of a series of drainage pipes to direct water through and away from the bridge.

What This Section Covers: This section covers only scupper systems, since design of these systems are often located in a traveler’s cone of vision and can detract from the aesthetic appearance of a bridge. This section describes ODOT’s baseline for scupper systems and a discussion of enhancements and potential issues to avoid. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Vertical Pipe Scuppers: Locate inside the fascia beam. The bottom of the vertical pipe should extend a minimum of 8” below the bottom of the fascia beam. Paint the vertical pipe to match the color of the fascia beam.

Scuppers/Drainage Pipe Collection Systems: Locate inside the fascia beam. Vertical pipes within these collection systems should be attached to the inside of pier columns, away from the view of approaching traffic whenever possible. See BDM 209.3 for design guidelines and specifications.
Enhanced Treatment Options:
There are few enhancements that can be employed to improve the appearance of bridge drainage systems beyond the baseline treatments described above. If there are no other design options available other than using scuppers/pipe collection systems, the primary treatment involves concealing the pipes from a traveler’s line-of-sight or using colors to blend the pipes into the bridge substructure. If carefully planned, these treatments are effective since drainage collection systems are generally not prominent structural elements on most bridges and are not easily noticed at highway speeds. See below for discussion and photograph examples of some designs that should be avoided to the extent possible.

Planning, Design, and Maintenance Considerations:

- Aesthetic Goal Summary: As described above, the aesthetic goal for scuppers/drainage collection systems on bridges is to conceal and blend. Drainage pipes look out of place when mounted on a large flat surface, such as a bridge abutment, or directly on the visible face of a pier. These become particularly noticeable and aesthetically unappealing if rusted or not painted to match, as illustrated in the photographs below.

- Scupper Guidelines: Per BDM 209.3, the number of scuppers used for collecting the deck surface drainage should be minimized or eliminated if possible. Scuppers with drainage collection systems should be placed as close as possible to the substructure unit which drains them. Uncollected scupper downspouts should be as far away from any part of the structure as possible. When deck drainage is to flow off the ends of the bridge, provisions must be made to collect and carry away this run-off.

- Drainage Pipe Guidelines: Drainage collection systems placed inside the fascia beam can be prone to clogging. Per BDM 209.3, drainage systems should be sloped as steeply as practical, generally not less than 15 degrees. The system should have a minimum bend radius of 18 inches, no 90 degree bends, adequate pipe supports and cleanouts at the low ends of runs. The cleanout plugs should be easily and safely accessible.

- Maintenance Considerations: The structural life of scuppers and drainage collection systems are approximately 50 years, and are typically replaced during superstructure rehabilitation or replacement projects. Repainting exposed pipes will likely be necessary every 20 to 25 years for aesthetic purposes and to minimize rust/discoloration.

Cost Considerations (Base Year 2017):
Scuppers with cutoff vertical pipes can be constructed for a relatively small cost (approximately $1,400 per scupper). The cost involved with scuppers with full drainage pipe collection systems is affected by the length and width of the bridge. These collection systems cost approximately 100 to 300 percent more to install than a standard vertical pipe scupper system. Repainting drainage pipes costs approximately $25 per linear foot.

Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.1.7 Bridge Lighting (Decorative)


Overview:
Background Information: There are four general types of bridge lighting: 1) roadway/street lighting that extends across a bridge for the purpose of lighting the roadway surface, 2) decorative street lighting that is placed on a bridge for aesthetic purposes only (no functional lighting purpose), 3) lighting placed on abutments or pier columns for the purpose of illuminating a roadway below the bridge, and 4) lighting installed under a bridge or directed at a bridge primarily for aesthetic purposes (in certain circumstances, this lighting may have a pedestrian safety purpose as well).

What This Section Covers: This section addresses Item 4: lighting installed under a bridge or directed at a bridge primarily for aesthetic purposes. Items 1-3 above are further discussed in Section 5.2.8 (Roadway and Street Lighting).

Baseline Treatments:
There is no baseline treatment for this type of decorative bridge lighting. All lighting of this nature is considered to be an enhanced treatment. See Section 5.2.8 for discussion of roadway/street lighting on bridges.

Enhanced Treatment Options:
On occasion, communities desire to illuminate bridges that are considered to be a focal point of their downtown, business, or entertainment district. These are typically “gateway” river crossing bridges that may have historical significance to a community or may be an integral part of a riverfront beautification or an urban revitalization program. This type of specialty lighting is often included as part of a broader aesthetic design plan for the bridge. The lights may be monotone (white) and/or multi-colored, and typically are designed to have the ability to change colors for special events or for seasonal changes. Decorative lighting of this nature can also be used for pedestrian safety purposes and/or to illuminate pictographs, special structural enhancements, or other points of interest on or around the bridge so they are visible at night. Examples of this type of bridge lighting are presented below.

Planning, Design, and Maintenance Considerations:
- Aesthetic Goal Summary: The aesthetic goal for decorative bridge lighting is to use vibrant colors and light/dark contrast, in concert with the shape of structural bridge elements, to create a visual focal point in an urban setting that is otherwise dominated by standard white street and building lighting. In most applications, the goal is to create a bold, memorable look that may be consistent with other color schemes used in the community or on adjacent bridges.
- Driver Safety: A key planning and design consideration for this type of decorative bridge lighting is driver safety. The lighting must be designed in a manner that is not distracting to drivers on or approaching the bridge.
Lighting Specialists: Stakeholders should consider including on the design team a lighting consultant and a landscape architect with experience in decorative bridge lighting to assist with design and for coordination with other aesthetic treatments on the project. The lighting consultant and landscape architect should work closely with the bridge designers to achieve the desired aesthetic effect while meeting all required structural engineering and traffic safety requirements.

Lighting Plans: When designing a lighting plan, designers should consider the location and aesthetic appearance of the light fixtures. To avoid degrading the aesthetic look of the bridge during daylight hours, designers should conceal or recess the decorative lighting fixtures to the extent possible. Lighting plans should also focus on unique bridge features, such as special girder or pier designs (such as the V-shaped piers shown in this photograph of the Stewart Street Bridge in Dayton), special textures, pedestrian walkways or overlooks, and logos and pictographs included on abutment walls, parapet walls, or pier faces.

Coordinating Multiple Bridges: These decorative lighting systems have evolved from control systems operated on-site to control systems run remotely by desktop computer. This changing technology is allowing stakeholders to control lighting on multiple bridges (as well as lighting on other structures - such as office buildings) as one coordinated system and make lighting adjustments simultaneously. This can allow for large-scale color synchronization along an entire riverfront, or across an entire downtown area.

Public Requests: Once a lighting system is installed and operating, stakeholders will ultimately receive requests from the public for certain color combinations for special events, seasonal themes, special causes for public awareness, and even political and religious causes. Before a lighting system becomes operational, stakeholders should develop a written policy regarding public requests for specific color combinations and consistently apply the policy on all requests.

Maintenance Considerations: Decorative lighting systems are a rapidly evolving technology, from electrical hardware components, LED luminaires, to computer software. Stakeholders should be aware that, like many other computer-controlled technologies, today's system will be quickly replaced by systems with better electronics, better bulbs that are cheaper, more efficient, and more aesthetically appealing, and better software that allows coordination of bigger systems more efficiently. ODOT upgraded the lighting system on the I-280 bridge over the Maumee River (Veteran's Glass City Skyway) approximately 10 years after construction.

Presently, designers and stakeholders should strongly consider using LED luminaires for longevity and lower energy costs. LED luminaires and associated lighting hardware currently have a lifespan of about 10 years. Since this typically coincides with major changes in technology, stakeholders may desire (or consider planning for) wholesale system replacement/upgrade, instead of replacing individual elements as they reach the end of their lifespan.

Designers and stakeholders should consider limiting the number of different lighting types and fixtures used on a bridge, which can improve maintenance efficiency and reduce long-term costs. On-site control systems should be located such that they do not detract from the appearance of the bridge, are secured from vandalism, yet are accessible for maintenance.

Cost Considerations (Base Year 2017): In general, the cost of a decorative bridge lighting system will range from approximately 1 to 2 percent of the cost of a new bridge or bridge replacement project. LED luminaires can cost substantially more to install than standard bulbs but will last significantly longer and can deliver up to 90% energy savings. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.1.8 Bridge Layout Considerations

Overview:
Structure layout and span arrangements can affect a viewer’s perception of a bridge. Decisions on layout and span arrangement are controlled by complex site and cost factors. ODOT uses a Structure Type Study to evaluate structure alternatives and costs, which includes such factors as geometry, economics, maintainability, constructability, right-of-way constraints, disruption to the traveling public, waterway crossing requirements, grade separation requirements, clearances, foundation considerations, historical and environmental concerns, hydraulics, and aesthetics. Per ODOT’s Bridge Design Manual (BDM 205.2), the length of a bridge is determined by the requirements for horizontal clearance at grade (highway or railway) separations or by the requirements for waterway opening at stream crossings. Vertical and lateral clearances are established per BDM 207. Typically for any given bridge, there are a number of combinations of spans and span lengths that can be utilized. Generally, a preferred span arrangement that minimizes the number of substructure units should be used (i.e. fewer piers with longer spans).

- For grade separation structures spanning any divided highway, a two-span bridge with spill-through slopes is preferred by ODOT.

- For waterway crossings, one-span or three-span bridges are typically used (large river crossings often use five span bridges, or more). These odd numbered span arrangements are preferred so that a pier is not located in the middle of the channel. This is an important factor on navigable waterways.

- When a multiple-span arrangement is required, designers should determine the most economical number of spans required based on total bridge costs, including a substructure and superstructure cost optimization study. Site conditions will govern the location of substructure units with respect to required horizontal clearances, foundation conditions and aesthetics.

Aesthetic Considerations:
Keeping in mind the general bridge layout preferences summarized above, and the design guidelines and specifications detailed in the BDM, the following are several aesthetic goals that designers may consider when preparing a Structure Type Study and establishing a bridge’s layout, proportions, and presentation. Note: These ratios are for designer consideration for aesthetic purposes, and are not design requirements. Designers should understand that some (or all) of these may not be feasible or practical on any given bridge design.

**Summary of Key Bridge Aesthetic Ratios/Goals:**

- **Slenderness Ratio:** Span Length to Girder Depth = 20:1 to 30:1
- **Pier Width to Superstructure Depth:** Depth/4 < width < Depth/2
- **Pier Width to Girder Depth:** Depth/2 < width < 2/3 Depth
- **Stub Abutment Height:** Height (Abutment Face) ≥ 1/2 Girder Depth
- **Partial Abutment Wall Height:** Height<1/2 vertical clearance (and > girder depth)
- **Full Abutment Wall Height:** Height (Abutment Face) = vertical clearance
- **Fence/Railing Post Location:** 1/2 distance between parapet sawcuts
- **Deck Overhang:** 2/3 girder depth

- **Skewed Bridges:** Skewed bridges present aesthetic design challenges, often requiring additional pier columns, elongated pier caps, atypical wing wall configurations, angled vantage points, and possibly unequal span lengths, as illustrated in this photograph. Designers should consider the possible visual effect of piers stacking up against one another, and to the extent possible, minimize the number of columns, increase deck overhang, maintain piers parallel to each other or radial to a curved superstructure, and keep pier shapes as simple as possible.
Aesthetic Guidelines – Bridge Layout Considerations

- **Span Proportions**: Proportions on single-span structures require careful consideration due to short spans. Two-span structures are well-suited to divided highways due to the central pier and equal span lengths. Three-span structures appear visually balanced with a wider span in the middle and shorter spans at each end.

- **Span Lengths**: Span lengths that exceed pier heights are preferred from an aesthetic standpoint. In instances where a bridge is located on a slope (or a ramp descends to a lower elevation), span lengths should decrease proportionally as structure height decreases, if possible.

- **Slenderness Ratios**: A primary aesthetic goal for bridges is to maintain a slender superstructure while maintaining continuity and proportion. The slenderness of a superstructure is the ratio of the beam/girder depth to span length. Slenderness ratios generally range from 10 to 40. Ratios approaching 10 will often appear overly bulky. Ratios approaching 40 will often appear overly thin and fragile.

- **Single-Span Bridges**: A typical aesthetic goal for a single-span bridge is a slenderness ratio between 20 and 30. The appearance of single-span bridges is highly sensitive to girder depth and abutment size, particularly when ratios approach 10. In some cases, the need for proportion outweighs the need for slenderness, and a thicker girder depth is needed to visually balance large abutments and short span lengths (or vice versa). As span lengths widen, and/or abutments become smaller, shallower girder depths are needed (when possible) as the aesthetic focus shifts back to a slender superstructure.

*Single-Span Bridge (Slenderness Ratio ~ 25)*. The slenderness ratio of this bridge is appropriate for the span length. Though the long, light-neutral parapet wall and proportional girder depth give the superstructure a slender appearance, the large and visually prominent abutments divert attention away from the superstructure.

*Single-Span Bridge (Slenderness Ratio ~ 25)*. This bridge has a span length and girder depth similar to the previous example. However, in this case, the abutments are not visually prominent, and the parapet wall is shorter, giving the superstructure a bulkier appearance.

*Single-Span Bridge (Slenderness Ratio ~ 25)*. This bridge has slenderness ratio similar to the two examples above, though narrow abutments, a strong shadow line, and a long parapet wall give the appearance of slenderness and draw attention to the superstructure.

*Single-Span Bridge (Slenderness Ratio ~ 10)*. The girder depth on this railroad bridge is noticeably deeper and the span length is substantially shorter than the other examples, which is reflected in the low slenderness ratio. Combined with the narrow abutments, this gives the superstructure a bulky appearance.

Continued
Two-Span Bridges: For two-span bridges, consideration of slenderness should be weighed against a desire (or need) to establish a central focal point for the bridge, which is a unique consideration for two-span structures due to the central pier location. The preferred approach is to accentuate the visual prominence of the abutments in proportion with the beam/girder depth and reduce the visual prominence of the central pier (to the extent possible) and focus attention on the entire structure, rather than a central point.

Multi-Span Bridges: Three-span bridges are primarily located where divided highways overpass side roads, or where highways cross large streams. Three-span bridges on waterway crossings often have a central span that is longer than the two end spans (to avoid having a pier in the channel). Three-span bridges over side roads typically have equal span lengths when using concrete beams, as shown in the example photograph below. Three-span bridges with steel beams will typically have a center span that is longer than the end spans. Four-span bridges are common on multi-lane divided highways, particularly on side road overpasses in rural areas where the right-of-way is wide. Four-span bridges with steel beams are most appealing (and structurally most efficient) when the two center spans are of equal length, the two end spans are of equal length and approximately 80% of the length of the middle spans, and length of the end spans is greater than the pier height. Bridges with more than four spans are primarily found in major interchanges, urban settings (viaducts), and large river crossings. With multi-span bridges, designers should attempt to emphasize the appearance of the superstructure, keep end spans proportional and visually balanced, and maintain constant structure depth.
5.1.9 Pedestrian and Bicycle Bridges

**ODOT Design Manual Reference:** Pedestrian and bicycle bridges are addressed in ODOT’s Bridge Design Manual (BDM 209 and BDM 301). Per BDM 301.4.2, pedestrian and bicycle bridges must be designed in accordance with the current edition of AASHTO’s Load and Resistance Factor (LRFD) Bridge Design Specifications (as well as the BDM and other applicable ODOT manuals). ODOT’s most current design guidelines are available at ODOT’S Design Reference Resource Center (DRRC) website.

**Overview:** Pedestrian/bicycle bridges are typically used in urban environments to allow users to safely cross multi-lane, high speed highways. Pedestrian/bicycle bridges are also commonly used on recreational trails for roadway or river crossings. There is a wide range of design options for pedestrian/bicycle bridges, and typically the goal for designers and stakeholders is to create an economical design that aesthetically fits with a specific theme or context. For a basic stream or road crossing, a simple prefabricated structure may be all that is necessary (or desired). For an urban highway crossing or a river crossing in a scenic area, a more extravagant, multi-spanned bridge with aesthetic treatments may be desired.

**Baseline and Enhanced Treatments:** From an overall design process and aesthetic standpoint, the guidelines provided in Chapters 2, 3, 4, and 5 of this document generally hold true for pedestrian/bicycle bridges. However, since pedestrian and bicycle bridges have special design constraints and specifications, designers and stakeholders should initiate discussions with ODOT early in the design process to discuss baseline and enhanced treatments, funding considerations, and maintenance responsibilities (see Chapter 2 for additional information). The following are several examples of pedestrian/bicycle bridges in Ohio.

*Great Miami River Trail Over the Great Miami River, Miami County.* This 290-foot two-span bicycle/pedestrian bridge has several decorative treatments, including haunched weathering steel girders, decorative railing, and matching stone piers and pilasters.

*Pedestrian Bridge Over I-675, Beavercreek.* This 475-foot multi-span, steel bridge connects the Wright State University campus to a large retail/shopping area. The red brick and light-neutral ashlar block MSE walls match the piers. Black vandal fence provides additional contrast.

*Olentangy Trail Bridge Over SR 315, Columbus.* This 500-foot multi-span bicycle/pedestrian bridge has weathering steel girders and fully enclosed vandal protective fencing. Note the shadow line created by the overhanging deck.

*Pedestrian Bridge Over I-675, Beavercreek.* This 475-foot multi-span, steel bridge connects the Wright State University campus to a large retail/shopping area. The red brick and light-neutral ashlar block MSE walls match the piers. Black vandal fence provides additional contrast.

Little Miami Scenic Trail Over the Little Miami River, Newtown. This 360-foot, three-span bicycle/pedestrian bridge utilizes a weathering steel superstructure for a natural, rustic appearance within this scenic river corridor.

*Olentangy Trail Bridge Over SR 315, Columbus.* This 500-foot multi-span bicycle/pedestrian bridge has weathering steel girders and fully enclosed vandal protective fencing. Note the shadow line created by the overhanging deck.
Cost Considerations (Base Year 2017):
Construction costs for pedestrian/bicycle bridges vary greatly depending on length and design. A short-prefabricated structure used for basic stream and roadway crossings can cost less than $500,000. Longer, multi-span structures with aesthetic enhancements, such as the two Great Miami River Trail examples above, can cost more than four times that amount. For the most part, the maintenance considerations summarized in Sections 5.1.1 through 5.1.6 will be applicable for pedestrian/bicycle bridges as well.

Centennial Lake Link Trail Over Scranton Road, Cleveland. This is a 125-foot, single-span bicycle/pedestrian bridge that connects to the Ohio & Erie Canal Towpath Trail. The steel superstructure is painted black, which gives it a bold appearance against the background sky.

Pedestrian Bridge Over I-475, Toledo. This 205-foot, two-span bridge was constructed as part of a larger I-475 corridor project. The structural and aesthetic elements of this bridge (piers, girders, parapets, vandal fencing, and lighting) match adjacent overpass bridges in this corridor.

Pedestrian Bridge Over I-71, Cincinnati. This 200-foot two-span pedestrian bridge links two residential areas divided by I-71 in the community of Evanston. This bridge combines bold aesthetic elements (orange girders and black decorative railing) with fully-enclosed vandal fencing.

Great Miami River Trail Over the Great Miami River, Dayton. This 225-foot three-span bicycle/pedestrian bridge has a cable-stayed design. All steel members, including the towers and railing, are painted a deep red color, giving it a striking and unique appearance.
5.2 ROADWAY ELEMENTS

This section describes the primary aesthetic elements (excluding bridges) that occur along Ohio’s roadways, including: retaining walls, longitudinal barriers, noise walls, lighting, traffic signals, signs, right-of-way fencing, sidewalks, medians, traffic islands, landscaping, and utilities. These elements are common and prominent in all corridor types, and when viewed collectively, provide travelers with a sense of order and corridor unity.

5.2.1 Retaining Walls

ODOT Design Manual Reference: Bridge Design Manual (BDM) 204.6, 303.5; Location & Design Manual (L&D) Volume 3, 1404.2; Supplemental Specification 840

Overview:
Background Information: Retaining walls are used for slope stabilization and embankment support when it is necessary for the purposes of roadway or bridge construction. These structures are typically utilized when right-of-way is limited or too expensive to purchase. There are numerous wall types, as outlined in BDM 204.6. ODOT uses a Retaining Wall Justification Study to determine when a retaining wall is needed and to evaluate different wall types, locations, costs, and impacts. ODOT primarily uses cast-in-place reinforced concrete walls or a proprietary wall system (including MSE walls - see Supplemental Specification 840). The other wall types listed in BDM 204.6 are typically used under special project conditions. Aesthetic treatments applied to retaining walls are typically limited to formliner patterns, logos and pictographs, and tinted concrete sealers.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for retaining walls. MSE walls associated with bridge abutments are addressed in Section 5.1.5. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Apply an ashlar block, dry stack, or fractured fin formliner to cast-in-place retaining walls, MSE walls, or other concrete retaining walls. Apply a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778).

Enhanced Treatment Options:
As mentioned above, aesthetic enhancements for retaining walls typically involve application of special formliners to create unique patterns, textures, and relief. Formliners are also used to incorporate pictographs and logos into the face of a retaining wall. Logos are further addressed in Section 5.2.6. A wide range of light-neutral and dark-neutral colors are available for sealer coatings to coordinate with other color schemes used throughout a corridor, or on adjacent structural elements (such as a bridge abutment, or noise wall). On rare occasions, retaining walls are constructed out of stone blocks or brick to achieve a higher level of aesthetic appearance. Several examples of decorative (enhanced) retaining walls that have been used on ODOT/LPA projects in Ohio are presented below. Brief descriptions of applicable visual design elements and aesthetic design qualities are presented in the captions below the example photographs. Additional planning, design, maintenance, and cost considerations are presented on the following pages.
Enhancement Example: SR 883, Pomeroy. This retaining wall contains numerous pictographs depicting small town life along the Ohio River. This wall uses contrasting light and dark-neutral colors to make the images clearly stand out, but avoid being overly distracting. The images are appropriately scaled for highway traffic approaching the Pomeroy bridge.

Enhancement Example: SR 883, Pomeroy. This is a close-up of the retaining wall shown in the previous photograph. Note that the pictographs have a smooth face (right arrow) on a fractured fin background (left arrow) providing eye-catching relief. Also of note: the drains along the bottom of the wall are painted matching colors.

Enhancement Example: Milford Parkway at US 50, Milford. This is a decorative retaining wall that utilizes concrete panels that simulate dry stack stone. Note the discrete tie-backs (yellow arrow) that anchor the panels to the structural wall behind (not visible).

Enhancement Example: I-71 at Martin Luther King Drive, Cincinnati. This wall has a variation of the dry stack stone theme, and is coated with a light gray sealer. As shown in the I-75/SR 4 example on the next page, sealing the wall cap, the barrier in front of the wall, and the barrier above the wall with a contrasting color would improve its appearance.

Enhancement Example: I-75, Dayton. This is an example of a pictograph incorporated into an MSE wall through the use of a formliner. This retaining wall was styled and colored consistent with retaining walls and bridge piers containing airplane/space flight themes in the nearby I-70/I-75 interchange (see next photograph).

Enhancement Example: I-70/I75 Interchange, Dayton. This interchange contains numerous MSE retaining walls with color schemes that match adjacent bridge piers. Some of the walls and piers contain airplane/space flight-themed images (as shown). These color schemes and images are also used on adjacent stretches of I-75 to establish corridor unity.

Continued
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Retaining walls are important aesthetic elements since they are relatively common (particularly in urban areas and interchanges), large in size, and typically located parallel to travel lanes within a traveler’s cone of vision. The primary aesthetic goal for retaining walls is to provide simple colors and patterns that complement or contrast other structural elements in the corridor, while avoiding driver distraction.

- **Design Specifications Related to Aesthetics:** Per BDM 204.6.2, if a cast-in-place or proprietary wall is justified, the design of the wall shall be in conformance with the current edition of AASHTO’s Load and Resistance Factor (LRFD) Bridge Design Specifications. The alignment of proprietary retaining walls should be straight and with as few corners or curves as is practical. When changes in wall alignment are required, use gradual curves or corners with an interior angle of at least 135 degrees whenever possible. Do not use corners with interior angles of less than 90 degrees.

- **Formliners and Sealers:** MSE walls are faced with precast concrete units that give the wall a geometric pattern. Even with this pattern, large MSE walls can have a monotonous appearance. Designers should utilize formliner patterns on all visible concrete retaining walls (baseline or enhanced) to avoid pattern monotony and hide inherent construction imperfections and weathering (superficial cracking, chipping, bowing) that are easily seen on smooth-faced concrete walls. Designers should also consider using flat-sheened sealers to avoid sunlight/headlight reflection typical of glossy sheens (as illustrated in this photograph). Smooth, glossy sheens also tend to make small imperfections in the wall more visible. As illustrated in the I-475 example above, designers should consider using a contrasting neutral color when sealing small retaining wall caps to minimize color monotony and provide contrast.

- **Graffiti:** Per BDM 303.1, in areas where concrete surfaces have a history of graffiti vandalism, the designer may add a permanent graffiti coating meeting the requirements of Supplement 1083 on top of the epoxy-urethane or non-epoxy sealer. ODOT recommends treating all exposed wall areas, since there have been instances where soaker guns have been used to place graffiti on the top of walls.

- **Logos and Pictographs:** Scale and proportion are critical elements for designers to consider when incorporating pictographs and logos into a retaining wall designs. Images that are too small or have details too fine to see at highway speeds are not only a waste of project funds, but can be distracting to drivers. The photographs below show two examples of retaining wall pictographs that are not appropriately scaled and may be problematic for drivers to view. See Section 5.2.6 for additional information.
Maintenance Considerations: The structural life of cast-in-place concrete retaining walls and MSE walls is approximately 100 years, though retaining walls located along highways or interchange ramps are likely to be replaced on a more frequent schedule in conjunction with widening or major rehabilitation projects. Resealing for aesthetics (weathering/discoloration) will likely be necessary every 20 years. Retaining walls are susceptible to damage from stones, debris, and salt spray when placed directly adjacent to the roadway shoulder, as illustrated in this photograph. Designers should consider using the baseline ashlar block or dry stack pattern in these situations (which are less susceptible to damage than fractured fin) or consider moving the wall further from the road (if possible). When walls are located directly along the shoulder, resealing may be necessary every 5 to 10 years. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for enhanced noise barrier treatments.

Cost Considerations (Base Year 2017):
The construction cost for a typical cast-in-place retaining wall with baseline formliner pattern and sealer is approximately $75 per square foot. The approximate cost for a typical MSE wall with baseline formliner pattern and sealer is approximately $90 per square foot. Special wall types can add substantial additional cost (up to 50 percent more). There is typically no additional cost for using different tinted sealers (instead of a light-neutral sealer). The use of specialty formliners to incorporate pictographs or logos into a retaining wall increases the cost by less than 5 percent in most cases, though this cost can vary depending on formliner complexity and proportionally declines with larger walls. Resealing concrete retaining walls is estimated at $3 per square foot. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.2.2 Longitudinal Barriers

ODOT Design Manual Reference: Location & Design Manual (L&D), Volume 1, 602 and 603

Overview:
Background Information: Longitudinal barriers are safety devices placed along roadways to shield motorists from natural and man-made obstacles. Longitudinal barriers function by containing and redirecting impacting vehicles. They are typically classified into three types based on relative strength characteristics: flexible, semi-rigid and rigid. High-tensioned cable systems are flexible barriers typically used in medians of divided highways to prevent cross-median crashes. The Midwest Guardrail System is ODOT’s semi-rigid barrier system. This guardrail system is used to redirect vehicles from steep slopes, waterbodies, and obstacles located within the clear zone such as bridge piers, bridge parapets, culverts, and sign supports. Rigid barriers are single slope concrete barriers which are used when barrier deflections cannot be tolerated.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for longitudinal barriers. Longitudinal barriers on bridges are covered in Section 5.1.1. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Flexible: High-tensioned, galvanized steel cable and anchor post systems (proprietary) per L&D 603.1.1.2.

Semi-Rigid: Galvanized steel “w-beam” rails (unpainted), wood or steel posts, and wood or composite blockouts (Midwest Guardrail System) per L&D 603.1.2 and Standard Construction Drawings - MGS Series.

Rigid: 42” or 57” single-slope concrete barrier, sealed with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778) per L&D 603.1.4 and Standard Construction Drawings RM-4.3, RM-4.5, and RM-4.6.
Enhanced Treatment Options:
Aesthetic enhancements are typically not applied to longitudinal barriers. There are no practical treatments for cable barriers and guardrail due to their shape, design, and safety specifications. Neither system should be painted. In rare circumstances, such as a project in a highly-sensitive scenic area, a special decorative guardrail could potentially be used. However, the decorative guardrail would have to be compliant with AASHTO’s Manual for Assessing Safety Hardware (MASH, 2016) and approved by ODOT. Designers may be required to submit crash report data to verify acceptability. In general, designers should avoid guardrail modifications or treatments for aesthetic purposes. Formliners are rarely used on concrete barriers along highways, in part due to long-term cost and maintenance considerations (these barriers are routinely struck and damaged by vehicles, debris, and salt spray). These barriers are also intended to have a smooth surface for crash safety purposes. Additional planning, design, maintenance, and cost considerations are presented below.

Planning, Design, and Maintenance Considerations:

- Aesthetic Goal Summary: Longitudinal barriers are necessary safety devices found along all highways in Ohio. These barriers have relatively inconspicuous profiles and are common, uniform in shape, and located so close to the road that we rarely notice them at highway speeds, unless damaged. Collectively, however, these longitudinal barriers have an important “background” aesthetic function in a highway corridor. Longitudinal barriers provide beneficial line and shape to a highway corridor, which results in an underlying sense of order, balance, and rhythm.

As travelers, we tend to only notice longitudinal barriers when they are damaged or particularly unsightly. When well-maintained, they can become the aesthetic equivalent of pavement edge lines or rumble strips. However, damaged or poorly-maintained barriers will immediately be noticed by travelers. Thus, the aesthetic goal for longitudinal barriers involves maintaining their consistent line, shape, form, and color, which helps preserve order, balance, and rhythm along a corridor. This can be accomplished through expedited repair of crash-damaged barriers, replacing rusted or severely discolored steel barriers, and resealing highly chipped, peeled, or weathered concrete barriers.

- Lengthy, Continuous Urban Barriers: The baseline treatment for longitudinal concrete barriers includes sealing with a light-neutral epoxy-urethane or a non-epoxy sealer. However, in some circumstances it may not be practical, or even aesthetically beneficial, to apply the baseline sealer to a concrete barrier. In situations where shoulder or median barriers extend continuously for long distances (sometimes miles) along urban freeways, the likelihood of frequent damage and high construction and maintenance costs may make it impractical to apply the baseline sealer in these areas. Furthermore, as sealer is applied in short sections on a per-project basis, over time the result is an unappealing checkerboard appearance (see next page). Designers should consult with ODOT on a case-by-case basis on urban projects with concrete barriers, and consider the following options:

  - The baseline light-neutral sealer should be applied to isolated concrete barriers associated with bridge piers, retaining walls, bridge parapets, or noise walls that also have a light-neutral sealer.

  - Consider applying the baseline light-neutral sealer to segments of longitudinal concrete barrier when there are clear beginning and ending points, such as the end of a barrier or a beginning of a previously-sealed section (consult with ODOT on a case-by-case basis).

  - Consider avoiding use of the baseline light-neutral sealer when adjacent unsealed longitudinal barriers extend well beyond the project limits (consult with ODOT on a case-by-case basis).

  - When applying the baseline sealer to bridge parapets (per ODOT’s Bridge Design Manual), and these bridge parapets are bordered by short sections of unsealed concrete barriers, consider sealing the adjacent longitudinal barrier(s) to match, if feasible. If the parapets are bordered by long sections of unsealed barrier, consider using a sealer color that matches the color of the adjacent unsealed concrete barriers to avoid the “checkerboard” effect shown in the photograph on the next page (consult with ODOT on a case-by-case basis).
Maintenance Considerations: The structural life of a baseline cable barrier or steel guardrail system can be 50 years or more, though they are frequently replaced due to crash damage. Concrete barriers have similar structural lifespan but are also typically replaced over shorter timeframes due to crash damage or in conjunction with a roadway widening or major rehabilitation project. Resealing concrete barriers along roadways may be necessary every 5 to 10 years due to damage from stones, debris, and salt spray, or as damaged by vehicular crashes. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.

Cost Considerations (Base Year 2017):
The construction cost for baseline cable barrier, guardrail, and 42” concrete barrier is approximately $15, $20, and $130 per linear foot, respectively. Resealing concrete barriers is estimated at $3 per square foot. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.2.3 Noise Barriers

ODOT Design Manual Reference: Bridge Design Manual (BDM) 800; see also ODOT’s Highway Traffic Noise Manual

Overview:
Highway noise impact assessment procedures, noise abatement procedures, coordination requirements, and noise abatement criteria are based on Title 23 Code of Federal Regulations Part 772 and the latest revision of FHWA’s Highway Traffic Noise Analysis and Abatement Guidance. ODOT’s Highway Traffic Noise Manual was developed in compliance with these guidelines and is applicable to all federally funded or 100% State funded projects. As part of ODOT’s Project Development Process (PDP; see Chapter 3), noise analyses are conducted to determine if a project will result in noise impacts to adjacent noise-sensitive receptors. If noise impacts are identified, ODOT analyzes various abatement options, including structural noise barriers. If a noise barrier is determined to be feasible and reasonable to construct (considering costs and level of abatement provided), ODOT uses public involvement to determine if the barrier is desired and the aesthetics of the barrier (color and texture). If the public involvement process determines that a noise barrier is desired, ODOT will commence detailed design and construction. Barrier height, length, location, color, and texture is determined though the PDP in accordance with the Highway Traffic Noise Manual. Barrier design is conducted per BDM 800 and Standard Bridge Drawing NBS 1-09.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for noise barriers. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Baseline treatment details for noise barrier panels, panel caps, posts, and steps/transition are specified in BDM 802, NBS 1-09, and Chapter 7 of ODOT’s Highway Traffic Noise Manual. Standard colors and textures are specified in Appendix K of ODOT’s Highway Traffic Noise Manual, and are summarized below. Note: The photographs below are examples to illustrate various baseline color and texture options. Not all barrier components (posts, caps) shown in these photographs may exactly reflect current ODOT design standards or preferences.

Baseline Texture Options: ODOT’s baseline noise barrier preference is concrete with an ashlar block (stone) formliner pattern (per BDM 802). Other texture options available for public/stakeholder selection as a baseline treatment are: 1) concrete with dry stack formliner pattern, 2) concrete with fieldstone formliner pattern, 3) fiberglass with horizontal groove pattern, and 4) vegetative screening. Clear acrylic panels are considered enhancements, but in some circumstances may be considered as a baseline treatment if there are adjacent sensitive land uses (see the Planning, Design, and Maintenance Considerations section for additional discussion).

Baseline Color Options: Standard color options available for public/stakeholder selection as a baseline treatment are: 1) beige, 2) light gray, and 3) tan. ODOT’s current baseline preference is not to apply colored sealers to concrete noise barrier posts along roadway shoulders.

Noise Barriers on Bridges: Fiberglass (or other lightweight) noise barrier panels (beige, light gray, or tan) with steel posts are ODOT’s baseline standard for structure-mounted barriers. Clear acrylic panels are considered enhancements, but in some circumstances may be considered as a baseline treatment if there are adjacent sensitive land uses (see the Planning, Design, and Maintenance Considerations section for additional discussion).
Baseline: Light Gray Concrete Barrier with Dry Stack Pattern

Baseline: Beige Concrete Barrier with Dry Stack Pattern

Baseline: Light Gray Fiberglass Barrier with Horizontal Groove Pattern (Note the Incremental Step Down - Yellow Arrow)

Baseline: Tan Fiberglass Barrier with Horizontal Groove Pattern

Baseline: Light Gray Fiberglass Barrier with Horizontal Groove Pattern

Baseline: Tan Concrete Barrier with Fieldstone Pattern

Baseline: Tan Concrete Barrier with Dry Stack Pattern

Baseline: Light Gray Concrete Barrier with Dry Stack Pattern

Baseline: Vegetative Screening in ODOT Right-of-Way

Continued
Enhanced Treatment Options:
Noise barrier textures and colors not listed above are considered enhancements. Decorative posts and post caps are also considered enhancements. However, if a cost analysis determines that a special texture, color, or post style will not add additional cost to a noise barrier, ODOT may consider it as a baseline treatment and include it in the cost of the project. Logos and pictographs on noise barriers are considered enhancements and are further discussed in Section 5.2.6. For vegetative screening, ODOT will pay up to $125 per linear foot as the baseline. Clear acrylic panels are considered by ODOT to be an enhancement, unless sensitive land uses are involved (see next page for additional discussion). Designers and stakeholders should coordinate special noise barrier treatment requests with ODOT during the public involvement process for approval and for funding determinations. Several examples of enhanced retaining walls that have been used on ODOT/LPA projects in Ohio are presented below.

Note: Some barrier elements (posts, caps, etc.) shown below may not reflect current design specifications.

**Enhancement Example: I-75, Findlay.** ODOT considers brick patterned noise barriers to be an enhancement option. The dark gray color and the city logo are also enhancements.

**Enhancement Example: US 30, Richland County.** The race flag pictograph is an enhancement for this baseline tan noise barrier with dry stack pattern.

**Enhancement Example: I-475, Toledo.** This concrete barrier has a horizontal groove pattern with beige and light-neutral colors, which matches other corridor treatments.

**Enhancement Example: I-76, Mahoning County.** Similar to the example above, this baseline beige/dry stack noise barrier has a special pictograph as an enhancement.

**Enhancement Example: I-77, Akron.** In this application, the clear panels are considered decorative enhancements. The pictograph, post caps, and red brick are also enhancements.

**Enhancement Example: I-75, Troy.** This is another example of a community logo enhancement.

*Continued*
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Similar to retaining walls, noise barriers are important aesthetic elements since they are relatively common, large in size, and located parallel to travel lanes (often within a traveler’s cone of vision). Thus, the primary aesthetic goal for noise barriers is to provide simple colors, patterns, and textures that compliment or contrast other aesthetic elements in the corridor, but avoid driver distraction.

- **Aesthetic Guidance and Design Details:** Detailed aesthetic and design guidance for noise barriers are provided in ODOT’s Highway Traffic Noise Manual, including but not limited to: Chapter 7 (Barrier Design Criteria), Chapter 9 (Maintenance), Chapter 10 (Aesthetics), and Chapter 11 (Noise Barrier Best Management Practices). Noise analyses, public involvement, and barrier design process follows ODOT’s Project Development Process (PDP) - see Chapter 2 and Chapter 3 of this document for additional details. Design details for noise barriers are provided in BDM 800. Aesthetic guidance found in ODOT’s Highway Traffic Noise Manual is referenced in BDM 800. Designers should utilize both manuals when designing noise barriers.

- **Earthen Berms:** Numerous earthen berms currently exist along Ohio’s highway network for visual screening and/or traffic noise abatement. Many of these berms are located on private property, parallel to highway right-of-way. For most ODOT noise barrier projects, right-of-way width and topography/drainage needs are constraints for earthen berm construction. Presently, earthen berms and berm/barrier combinations on ODOT projects are uncommon and are currently considered enhancements, but are eligible for federal funding (see ODOT’s Highway Traffic Noise Manual, Chapter 10).

- **Ground-Mounted Clear Acrylic Barriers:** Per ODOT’s Highway Traffic Noise Manual, ground-mounted clear acrylic noise barriers will only be considered as a baseline treatment when the impacted land use is one that could be considered unique or has a special interest by the community (a central business district, historic property, or community facility) where a visual connection to/from the transportation facility is required to maintain that use. This determination, and ODOT review/approval, are coordinated through ODOT’s public involvement process. If approved by ODOT, the clear ground-mounted noise barrier will be funded by the project. Clear acrylic noise barriers desired for aesthetic purposes only will be considered an enhancement and the cost difference will not be funded by the project.

- **Structure-Mounted Barriers:** Fiberglass (or other lightweight) noise barrier panels with steel posts are ODOT’s baseline for bridges, due to cost considerations. Clear acrylic barriers (with steel posts) cost more than fiberglass barriers but are lightweight and can be used on bridges as an aesthetic enhancement. However, similar to ground-mounted barriers, clear acrylic noise barriers may be considered as a baseline treatment if a visual connection to/from the transportation facility is required to maintain a special adjacent land use. This determination, and ODOT review/approval, are coordinated through ODOT’s public involvement process. If approved by ODOT, the clear acrylic noise barrier will be funded by the project. Examples of structure-mounted noise barriers are presented on the next page.

Continued
Maintenance Considerations: Chapter 9 of ODOT’s Highway Traffic Noise Manual includes noise barrier maintenance information, as well as condition rating and maintenance action guidelines. From a structural standpoint, concrete noise barriers can last 50 years or more. Noise barriers located along a highway shoulder will require occasional panel replacement due crash damage or debris damage. Applying colored sealers for aesthetic and maintenance purposes will likely be necessary every 20 years. When barriers are located along the shoulder, sealing may be necessary every 5 to 10 years. Clear acrylic and fiberglass noise barriers will likely have a similar lifespan, though it has yet been determined how long clear acrylic panels will maintain an aesthetically-appealing transparent appearance. A typical manufacturer warrantee for clarity (non-yellowing) is 25 to 30 years. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for enhanced noise barrier treatments.

Cost Considerations (Base Year 2017):
The construction cost for a baseline concrete or fiberglass noise barrier is approximately $25 per square foot (per ODOT noise manual guidelines for determining noise barrier cost-reasonableness). The cost for a special concrete formliner to incorporate a community name, logo, or icon medallion into a noise barrier typically costs between $2,500 and $5,000 (see also Section 5.2.6). The cost for sealing a concrete noise barrier with a colored sealer is estimated at $3 per square foot. The construction cost for a clear acrylic bridge-mounted noise barrier is approximately $100 per square foot (per ODOT noise manual guidelines for determining noise barrier cost-reasonableness). ODOT will pay up to $125 per linear foot as the baseline for vegetative screening. Note: Vegetative screening does not provide traffic noise abatement. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.2.4 Highway (Right-of-Way) Fence

ODOT Design Manual Reference: Location & Design Manual (L&D), Volume I, Section 606

Overview:
Background Information: Right-of-way fences are a part of ODOT’s highway facilities and are placed within the right-of-way limits of controlled or limited-access highways. They act as physical barriers to delineate ODOT’s acquired access rights. ODOT (or other agencies) responsible for the maintenance of the roadways assume the responsibility for the maintenance of these fences. ODOT uses three standard fence types: Type 47, Type 47RA, and Type CLT, depending on roadway classification and adjacent land use. See the Baseline Treatments section below and the Planning, Design, and Maintenance Considerations section for additional information. Detailed fence design is conducted per L&D 606 and Standard Construction Drawings F-1.1, F-2.1, and F-3.1 through F-3.4.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for right-of-way fence. Vandal protection fencing is discussed Section 5.1.2. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Urban and rural freeways shall be continuously fenced. Fence is used on urban and rural arterials where there is limited access right-of-way. Designers should coordinate with ODOT regarding fencing on urban and rural collectors with limited access right-of-way. Standard fence types and uses per L&D 606 are summarized below.

**Type CLT:** Chain link fence with 60” fabric with a tension wire on top. Use on all innerbelt and radial urban freeways. Use on outerbelt freeways, rural freeways, and urban arterials with developed adjacent land use.

**Type 47:** Woven wire fence with a 47” fabric, steel line posts, and one strand of barbed wire on top. Use on outerbelt freeways and rural freeways with developed adjacent land use.

**Type 47RA:** Woven wire fence with a 47” fabric, wood line posts, and no barbed wire on top. Use on urban arterials with undeveloped adjacent land use and rural arterials.
Enhanced Treatment Options:
Aesthetic enhancements for highway right-of-way fence are relatively uncommon since they are not structurally prominent features (as opposed to retaining walls, noise barriers, and longitudinal highway barriers, for example) and are often located outside a traveler’s cone of vision. Highway right-of-way fence enhancements typically consist of the baseline Type CLT fence with a PVC coated/colored fabric and painted posts/hardware. On occasion, a decorative fence will be used that is similar to decorative railings used on bridges. Several examples of right-of-way fence enhancements that have been used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are presented below.


Enhancement Example: I-675, Dayton. Type CLT fence, black.

Enhancement Example: I-71/Gemini Place Interchange, Columbus. Type CLT fence, blue (matches adjacent blue bridge treatments).

Enhancement Example: I-270/Easton Way Interchange, Columbus. Type CLT fence, black.

Planning, Design, and Maintenance Considerations:
Aesthetic Goal Summary: Right-of-way fence is typically not an important aesthetic element in a highway corridor. Though it is installed along all of Ohio’s limited-access highways, it is normally located along the right-of-way line, often outside of a traveler’s cone of vision at highway speeds. Furthermore, it is not a structurally prominent feature (due to size, material type, and design) and is often obscured by vegetation, steep topography, landscaping, or structural elements.

In certain settings, however, such as a gateway interchange, an urban corridor with other aesthetic enhancements, or along a significant land use feature, right-of-way fence enhancements can utilize aesthetic design elements such as color and line to visually define and call attention to the right-of-way limits, signify landscaping boundaries, and help unify other enhancements in the corridor, as depicted in the enhancement photographs above.

Continued
Safety Considerations: On occasion, designers and stakeholders may desire use of a more aesthetically appealing and more visible fence along ODOT right-of-way. These are often post-and-rail fences that are made of wood or vinyl. This type of fence has been allowed by ODOT in a few instances, though ODOT generally discourages its use for safety reasons (unsecured, rigid horizontal members). Designers should consider potential safety issues involved with rigid horizontal rails, and vertical posts should be designed to break away on impact (equivalent to baseline right-of-way fencing). Designers and stakeholders should coordinate with ODOT early in the design process when this type of enhanced right-of-way fence is desired. Additional fence location and safety guidelines and considerations are provided in L&D Volume I, 606.

Maintenance Considerations: Steel right-of-way fence can have a structural life of 50 years or more. Decorative right-of-way fences with painted posts, railing, and/or hardware will typically require repainting every 20 to 25 years for aesthetic purposes and to minimize rusting/discoloration. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for enhanced right-of-way treatments.

Cost Considerations (Base Year 2017):
The construction cost for a baseline Type CLT fence is approximately $20 per linear foot and approximately $15 per linear foot for Type 47 fence. Colored versions of the Type CLT chain link fence (with PVC fabric coating and painted posts, rails, and hardware) is approximately $25 per linear foot. Special steel fence designs (similar to the example photograph on the previous page) are approximately $100 to $150 per linear foot. Vinyl post-and-rail fencing as shown above is approximately $20 per linear foot. The cost of repainting steel fence posts and associate hardware is approximately $15 per square foot. Repainting decorative steel or post-and-rail fencing (all components) can cost up to twice that amount. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.

Example of an enhanced post/rail right-of-way fence along SR 161 in New Albany.

Example of an enhanced post/rail right-of-way fence along I-71 in Grove City.

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5.2.5 Highway Guide Signs


Overview:
Background Information: Signs are an integral part of Ohio’s roadway network and provide critical directional, geographical, and point-of-interest information for travelers. Well-designed signage provides clear and concise details at opportune locations, allowing travelers to make accurate decisions quickly and safely.

Sign design and placement is complex and controlled at the federal, state, and local levels. Federal regulations and guidance are provided in FHWA’s Manual on Uniform Traffic Control Devices. The OMUTCD was developed for Ohio’s streets and highways per the Ohio Revised Code (ORC) and is in substantial conformance with FHWA’s manual. The OMUTCD provides general information on the design of traffic control signs, including the basic concepts of shape and color. It also provides specific information on the application of standard signs. Information on the location of signs, including height, lateral offset and longitudinal placement, is included as well. Since the OMUTCD applies to jurisdictions statewide, some of the requirements are general rather than specific in nature. This allows the respective jurisdictions, where appropriate, to develop their own standards and policies within the framework of the OMUTCD. ODOT’s TEM provides detailed design guidance and is intended to supplement the OMUTCD by presenting ODOT policies, standards, guidelines, practices and procedures concerning the design, construction, operations and maintenance of various types of traffic control signing.

What This Section Covers: There are numerous sign types, colors, and design specifications described in detail in the OMUTCD and TEM. This section focuses on three aesthetic design considerations on the most prominent signs in Ohio’s roadway network: freeway and expressway guide signs (TEM Chapter 209 and OMUTCD Chapter 2E). From an aesthetic standpoint, the primary consideration with guide signs involves: 1) the number of signs in a traveler’s cone of vision, 2) the spacing of signs, and 3) sign clarity. This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for highway guide signs. Community guide signs, logos, and lettering are discussed in Section 5.2.6. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Baseline treatment details for highway guide signs are detailed in OMUTCD Chapter 2E and TEM Chapter 209. Sign supports are unpainted and galvanized steel and aluminum. Designers should follow the sign spreading concepts described in OMUTCD Section 2E.11.
Enhanced Treatment Options:
Enhanced aesthetic treatments for highway guide signs are fairly limited due to cost and maintenance considerations and rigid standards for size, shape, and color. Enhanced treatment options that have been occasionally used in Ohio include monotube sign supports and painting or powder coating sign supports. Monotube sign supports are rarely used due to significant cost (approximately twice the cost of standard sign supports). Coating sign supports can also be costly and difficult to maintain, particularly on truss supports, due to the numerous small structural members (see photograph on previous page). These treatments are typically only used in gateway corridors or on special projects with other aesthetic enhancements. Examples of decorative (enhanced) sign supports that have been used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are presented below.

Baseline: Ground-Mounted Distance Sign (Freeway).
Baseline: Ground-Mounted Exit Sign (Freeway).

Planning, Design, and Maintenance Considerations:
- **Aesthetic Goal Summary:** Highway guide signs are prominent aesthetic elements on ODOT’s highway system because of their frequency and size. Since aesthetic enhancements to highway signs are relatively uncommon and often impractical due to cost and maintenance considerations (and specific design requirements with respect to appearance), avoiding sign clutter is the primary aesthetic goal for highway guide signs. This is accomplished through minimizing the number of signs, use of the sign-spreading concept, and coordinating information on signs in a manner that is simple and easy to understand. Replacing old signs (and sign lighting) with new highly reflective signs can also improve the visual appearance of highway signs and reduce clutter.

- **Minimizing Number of Signs:** This method will not be applicable in many situations since signs are typically installed for very specific purposes according to the OMUTCD. But as time passes and spot improvements are made, instances do arise where a short stretch of highway corridor ends up with an aesthetically unappealing and confusing conglomeration of signs. In such instances, designers should review sign layout and limit the number of signs (or sign supports) whenever possible per OMUTCD Section 2E.11. Example photographs are provided on the next page.
Aesthetic Design Guidelines – Highway Guide Signs

- **Sign Spreading**: Per OUMTCD Section 2E.11, sign spreading is a concept where major overhead signs are spaced so that road users are not overloaded with a group of signs at a single location. Sign spreading should be used at single exit interchanges, and at multi-exit interchanges where possible. The exit direction sign should be the only sign at the exit gore. The advance guide sign to indicate the next interchange should be located at the crossroad (not at the exit gore).

- **Avoiding Confusing Signs**: For traffic moving at highway speeds, simple signs with few words, few arrows, and appropriately sized text are functionally and aesthetically preferred. Though the OUMTCD, TEM, and SDMM manuals provide detailed guidance on fonts, lettering size, and sign layout, there are occasions when signs appear cluttered and confusing, even if designed per manual specifications.
Aesthetic Guidelines – Highway Guide Signs

- Maintenance Considerations: By nature, signs draw a lot of visual attention, and regular sign maintenance is important to the visual appeal of a highway corridor. Damaged signs are aesthetically unappealing and may cause driver confusion if information is missing or not clearly presented. Rusted supports or faded signs are also aesthetically unappealing, as are old signs with sign lighting fixtures. As illustrated in this photograph, even a small amount of rust or discoloration on sign supports is noticeable and can give the appearance of poor maintenance.

Highway signs have a lifespan of about 20 years. Sign supports typically have a longer lifespan (20 to 40 years) but will may show signs of rust and discoloration within 10 to 15 years. Paint on galvanized sign supports will flake and peel within a few years if not properly applied. Otherwise, repainting sign supports for aesthetic enhancement purposes and to minimize rusting and/or discoloration may be necessary every 10 to 15 years. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for enhanced sign support treatments.

Cost Considerations (Base Year 2017):
The construction cost for baseline cantilevered and truss sign supports varies based on size but are approximately $15,000 and $35,000 respectively. A galvanized monotube sign support costs approximately twice as much as ODOT’s standard sign support. Painting a cantilevered or monotube sign support will cost approximately $2,000. Painting a truss sign support will cost approximately $10,000. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.

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5.2.6 Community Guide Signs, Logos, and Lettering


Overview:

Background Information: Community guide signs are part of a coordinated system of signs that direct travelers and tourists to civic, cultural, and recreational destinations. Community guide signs can be found on ODOT’s freeways, expressways, and conventional road network and include: 1) conventional road guide signs and community wayfinding signs (TEM Chapter 205 and OMUTCD Chapter 2D), 2) general community information signs (TEM Chapter 206 and OMUTCD Chapter 2H), 3) general and specific service signs (TEM Chapter 207 and OMUTCD Chapters 2I,2J), 4) tourist-oriented directional signs (TEM Chapter 207 and OMUTCD Chapter 2K), and 5) recreational or cultural interest signs (TEM Chapter 207 and OMUTCD Chapter 2M). As a general rule, ODOT does not allow local jurisdictions to erect decorative guide signs in ODOT right-of-way. However, ODOT will consider decorative sign requests on a case-by-case basis provided they meet the requirements in TEM Section 210-3. ODOT will also consider community logos and lettering requests on bridges, noise barriers, and retaining walls within ODOT right-of-way, provided they meet the requirements and guidelines outlined in BDM 209.7.2 and 800, and ODOT’s Highway Traffic Noise Manual. All decorative signs, logos, and lettering are considered by ODOT to be enhancements.

What This Section Covers: There are numerous community guide sign types, colors, and design specifications, which are detailed in the TEM, SDMM and OMUTCD. There are also a wide range of decorative sign, logo, and lettering options. This section provides examples of baseline guide signs that provide community information (on freeways, expressways, and conventional roads), decorative signs in ODOT right-of-way, and logos/lettering on ODOT bridges, retaining walls, and noise barriers. Highway guide signs are further discussed in Section 5.2.5. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

Baseline Treatments:

Baseline treatment details for community-related guide and information signs are detailed in OMUTCD Part 2 and TEM Part 2. Sign supports and posts are unpainted and primarily galvanized steel. Decorative community signs, logos, and lettering are considered enhanced treatments (see next section).
Enhanced Treatment Options:

Enhanced aesthetic treatments for community signs, logos, and lettering primarily consist of small decorative signs in ODOT interchanges, formliner logo medallions on concrete noise barriers and retaining walls, and community names incorporated into decorative steel bridge railing or vandal protection fencing. Lettering in bridge railing/fencing can be very costly, and as a result is typically only used as a treatment on gateway interchanges. Small signs and medallion logos in retaining walls and noise barriers are a more cost-effective means of displaying a community name or logo for traveler/tourist viewing and can be found in many locations across Ohio. Several examples of decorative community signs and logos that have been used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are presented on the following pages.
Aesthetic Guidelines – Community Signs, Logos, and Lettering

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** From an aesthetic standpoint, the primary goals for community signs is to avoid clutter and provide easy-to-read information that is not distracting or confusing to drivers and provide a sense of place for travelers. This can be accomplished through the use of lettering that is large enough and spaced far enough apart to be understood at highway speeds, logos and pictographs that are simple and appropriately scaled, and utilizing contrast.

- **Utilizing Contrast:** Designers should strongly consider using the principles of contrast to help make signs, logos, and lettering logos) easy to read and aesthetically appealing. As discussed in Chapter 4, contrast can be achieved through use of colors, light and shadow, or physical dominance. For decorative signs and logos, physical dominance is not an option in many situations, and the use of light and shadow is not always effective, particularly on smaller signs with intricate details and shallow formliner patterns. However, use of contrasting light-neutral and dark-neutral colors is a highly effective method of making signs and logos “pop” to a traveler at highway speeds (bright colors can be distracting and are typically not allowed). When considering large lettering within bridge railing or fencing, the concepts of line, color, and contrast by physical dominance are all in play. This is illustrated in the Easton bridge example on this page. The bridge railing and lettering uses the concepts of strong horizontal lines and physical dominance to create contrast, even though the color does not.

- **Avoiding Simple Problems:** The photographs above show several good examples of sign, logo, and lettering enhancements that meet ODOT’s guidelines and provide the intended visual function. Below are some examples where scale, location, and color choice resulted in treatments that are either confusing or difficult to read, or both. Designers and stakeholders should avoid these simple shortcomings whenever possible.

*Continued*
Additional Guidelines and Considerations: The following are several key ODOT policies and guidelines with respect to decorative community signs, logos, and lettering:

- ODOT considers requests for bridge overpass lettering or logos from municipalities. ODOT will also consider requests from counties, townships, or other entities provided they are deemed by ODOT to be a major traffic generator or destination and the overpass location can be considered a “gateway”.

- Construction and maintenance costs for community signs, logos, and lettering are the jurisdiction’s responsibility (see Chapter 2 for additional information). Hardware and electricity costs for illuminating lettering and logos on bridges (similar to the Mason example above) are also the jurisdiction’s responsibility.

- Community signs, logos, and lettering must be incorporated into the design of a structure or structural element, or otherwise permanently affixed (ODOT does not approve signs, logos, or lettering that hang on walls or bridges). The size, design, number, and frequency of logos and icons placed on retaining walls and noise barriers are reviewed and approved by ODOT on a case-by-case basis. Business logos or advertising is prohibited, with the exception of specific service signs as depicted in this photograph.

Maintenance Considerations: Damaged signs are aesthetically unappealing and may cause driver confusion if information is missing or not clearly presented. Rusted supports or faded signs are also unappealing. ODOT requires decorative signs to be inspected and maintained by the local jurisdiction. Designers and stakeholders should refer to Chapter 2 of this document for discussion of maintenance responsibilities and agreements for enhanced sign support treatments. ODOT may stipulate in a participation agreement that failure to inspect and maintain could result in removal of the sign or logo at the local jurisdiction’s cost.

Continued
Decorative signs have various lifespans depending on material and treatment. As noted in Section 5.2.5, standard ODOT highway guide signs and supports have a lifespan of about 20 to 40 years. Decorative signs made of wood will typically have a 10 to 20-year lifespan with occasional painting or sealing (every 3 to 5 years). Logos and lettering in steel bridge railing can have a long lifespan (over 50 years) provided they are occasionally maintained. Repainting/resealing steel bridge railing/fencing for aesthetic purposes and to minimize rusting/discoloration will likely be necessary every 10 to 15 years.

Cost Considerations (Base Year 2017):
The construction cost for decorative community signs varies by size, material and complexity. A small sign similar to the previous Mt. Orab and Colerain Township examples is typically less than $1,000. Larger, more complex signs could cost several thousand dollars. The cost to create a concrete formliner for a basic community name, logo, or icon medallion typically costs between $2,500 and $5,000. More extravagant designs on larger formliners can cost substantially more. The cost for adding a community name to decorative steel bridge railing or fencing can increase the cost by 10 to 25 percent, depending on the size and detail of the lettering. The cost of repainting decorative signs, logos, or bridge railing with lettering also varies based on size and complexity. Large, detailed designs can cost $100 or more per linear foot. Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations for baseline and enhanced treatments.
5.2.7 Traffic Signals


Overview:
Background Information: Traffic signals are critical devices for controlling vehicular and pedestrian traffic at intersections. Traffic signal studies are used to determine whether installation of a traffic signal is justified at a given location. Signal design and placement is controlled at the federal, state, and local levels. Federal regulations and guidance are provided in FHWA’s Manual on Uniform Traffic Control Devices. State regulations and guidance are contained in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) which was developed for Ohio’s streets and highways per the Ohio Revised Code (ORC) and is in substantial conformance with FHWA’s manual. The OMUTCD provides general information on the design and operation of traffic signals. Since the OMUTCD applies to jurisdictions statewide, some of the requirements are general rather than specific in nature. This allows the respective jurisdictions, where appropriate, to develop their own standards and policies within the framework of the OMUTCD. ODOT’s TEM provides detailed design guidance and is intended to supplement the OMUTCD by presenting ODOT policies, standards, guidelines, practices and procedures concerning the design, construction, operations and maintenance of various types of traffic signals.

Traffic signals are the structural and operational focal point of a roadway intersection, and by nature draw extensive visual attention. The visual appearance of traffic signals is important from a safety standpoint, as the signal indications need to attract the attention of various road users, including those with impaired vision or are fatigued/distracted. Additionally, due their visual prominence at intersections, traffic signals are important to the aesthetics of a roadway corridor. The goal is to provide an appropriate combination of safety and aesthetic treatments under any weather or lighting condition.

What This Section Covers: This section describes ODOT’s baseline treatments and enhanced aesthetic treatment examples for traffic signals. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Signal Heads: Black polycarbonate plastic signal heads with cutaway visors and louvered backplates are the baseline standard. A strip of fluorescent yellow reflective sheeting (per TEM Section 420-4) shall be applied to the outside border of backplates. See Planning, Design, and Maintenance Considerations section for optional use of yellow signal heads.

Signal Arms and Supports: Galvanized support poles and mast arms per TEM Chapter 421 and Chapter 440. Mast arms should be straight. See Planning, Design, and Maintenance Considerations section for optional use of span wire signals.
Enhanced Treatment Options:
Enhanced treatments for traffic signals primarily involve different colored support poles and mast arms for unity with other intersection or corridor treatments. On occasion, a decorative pole style and/or haunched mast arms will be used to enhance the shape and texture of the traffic signal. These treatments are typically used in gateway interchanges, gateway corridors, and within municipalities. Several examples of decorative (enhanced) signal supports that have been used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are presented on the following pages.
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Traffic signals are the structural and operational focal point of a roadway intersection, and by nature attract drivers’ attention. Accentuating visual prominence of traffic signals without distraction has safety and aesthetic benefits. Black signal heads provide strong color contrast against a light blue sky, green vegetation, and light neutral concrete and subtly grab attention. Black mast arms and support poles provide additional contrast. The lustrous, metallic appearance of galvanized poles and mast arms with contrasting black signal heads can have a similar effect. The aesthetic goals for traffic signals are to: 1) use dark neutral colors to emphasize contrast whenever possible, 2) unify traffic signal pole and mast arm colors (and styles, if applicable) with other structural elements in a corridor or intersection, and 3) provide regular maintenance to address rust and discoloration and preserve the visual element of contrast. Below are a few related examples and considerations.

- **Special Funding and Maintenance Considerations:** There are a number of funding and maintenance considerations and requirements involved with traffic signals, based on location/jurisdictional boundaries and desired levels of aesthetic enhancement, as well as proprietary design considerations. Chapter 2 provides an overview of general funding and maintenance responsibilities regarding baseline and enhanced treatments (including traffic signals). Designers and local stakeholders should refer to TEM Part 1 (Chapter 100) and Part 4 (Chapter 400) for additional details and discuss these considerations with ODOT early in the design process.

- **Yellow Signal Heads:** Yellow signal heads are no longer an ODOT baseline option, though there are many yellow signal heads still in operation across Ohio. Yellow signal heads may still be used for spot maintenance purposes in roadway corridors or intersections where all other signal heads are yellow. However, on corridor projects or intersection projects where all signal heads are being replaced, black signal heads should be installed.

  "Continued"
- **Haunched Mast Arms**: Haunched mast arms are sometimes used as an aesthetic alternative to straight mast arms (see Enhanced Treatments section above). Haunched mast arms provide a subtle but attractive shape for little additional cost. Among other design considerations, designers and stakeholders should consider proximity to overhead utilities when choosing a mast arm style. The photograph on the previous page (bottom left) illustrates a scenario where straight mast arms were used to avoid overhead utilities (other mast arms in this corridor are haunched). However, depending on the location of the overhead utility, it may be necessary to use a haunched mast arm (with shorter support pole) to avoid an overhead utility.

- **Span Wire Traffic Signal Systems**: Per TEM Chapter 440, black or galvanized mast arms are ODOT’s baseline traffic signal support. Span wire signal designs are no longer a baseline option and from an aesthetic standpoint are visually unappealing. However, span wire designs may still be used in situations where intersection configuration makes mast arms impractical and necessitates the use of a span wire design. Examples of span wire signals are presented below. All polycarbonate signal heads should be tethered, as well as signal heads with backplates per TEM Section 420-4.5.

- **Maintenance Considerations**: As discussed on the previous page, designers and stakeholders should refer to Chapter 2 of this guidance and TEM Chapter 100 and TEM Chapter 400 for maintenance responsibilities involved with traffic signals. Traffic signal function and appearance are highly important to traffic safety, and regular maintenance is crucial to ensuring traffic signals remain operable and are not aesthetically unappealing or distracting. TEM Section 460-3 and Section 460-4 summarize preventative and as-needed signal maintenance guidelines, including approximate life expectancy for signal supports, hardware, and electronics.

In general, signal poles and mast arms have a 30-year life expectancy. Signal heads have about a 15-year life expectancy. Unpainted galvanized poles and mast arms may show signs of discoloration (and possibly rust) within 5 to 10 years. Paint applied to galvanized poles and mast arms will flake and peel within a few years if not properly applied. Repainting for aesthetic purposes and to minimize rusting/discoloration will likely be necessary every 10 to 15 years. Designers and stakeholders should ensure that maintenance crews or contractors use the correct color and/or sheen of paint when repainting. In this photograph, the signal pole on the right is painted in a gloss black, while the adjacent street light has a matte black finish.

**Cost Considerations (Base Year 2017):**
The construction cost for a baseline galvanized signal pole and mast arm is approximately $10,000. Black painted poles and mast arms (instead of galvanized) adds approximately 5 to 10 percent to the cost. There is no cost difference between a black and yellow signal head. Decorative poles and mast arms (as illustrated in the Enhanced Treatments section) can cost up to 75 percent more than baseline poles/mast arms. Repainting signal poles and mast arms after installation can be costly (10 to 20 percent - or more - of the overall signal cost). Thus, it is crucial that paint is applied correctly by the manufacturer (or contractor) prior to installation to avoid flaking or peeling.
5.2.8 Highway and Street Lighting


Overview:
Background Information: ODOT provides lighting on its urban and rural highway system and interchanges for safety and wayfinding purposes, where it is determined to be warranted. Per TEM Chapter 1103 and Chapter 1104, lighting warrants are based on the need for highway lighting and the benefits derived from lighting. In justifying lighting, many factors are considered, including traffic volume, speed, nighttime road use, night accident rate, road geometrics, general night visibility, economic benefits, and future increase in capacity or changes in road use. The decision to install lighting, and to what extent, is dependent on many other factors, such as, ODOT priorities, project cost and participation, funding, public input, and economic benefits and public safety.

The two primary types of ODOT highway lighting include continuous freeway lighting and interchange lighting (complete, intermediate, or partial). Special lighting situations include underpasses and tunnels, rest areas, intersections, bicycle and pedestrian facilities, weigh stations, park-and-ride facilities, school zones, and large bridges.

ODOT has three basic hardware designs for freeway and interchange lighting: high-mast, low-mast (shepherd’s hook), and conventional. Low mast is ODOT’s preference for freeway median and interchange lighting. Use of high-mast lighting and twin truss arm conventional lighting is generally discouraged unless safety conditions/illumination needs at a specific location warrant their use. Single truss arm conventional lighting is typically used along ramps and outside shoulders. When warranted, conventional lighting is also used on ODOT-maintained bridges to illuminate the roadway. For local street projects that utilize federal funds, ODOT provides several baseline pole and baseline luminaire options for local jurisdiction consideration (see below).

What This Section Covers: This section covers the predominant lighting elements on Ohio’s roadway network related to aesthetics: 1) freeway lighting, 2) interchange lighting, and 3) local road/street lighting (including street lighting on bridges). Decorative bridge lighting is covered in Section 5.1.7. See the Baseline Treatments, Enhanced Treatments, and Planning, Design, Maintenance, and Cost Considerations sections below for additional information regarding lighting treatments.

Baseline Treatments:
Freeway and Interchange Lighting: In freeway medians and interchanges (where warranted), low-mast light poles with LED luminaires. Along outside shoulders, conventional truss arm light poles with LED conventional (cobra head) luminaires. Light poles shall be galvanized steel or satin-brushed aluminum (see Planning, Design, and Maintenance Considerations Section for exceptions).
Street Lighting: Four baseline light pole styles are available: truss arm, davit, post-top, or monoarm. Four baseline LED luminaire styles are available: cobra head, teardrop, shoebox, and lantern. The lantern style can only be used with post-top poles. Poles and luminaires along low-speed facilities (by L&D Manual definition) should be painted black. Teardrop luminaires should only be used along low-speed facilities. Black coloring may not be used along high-speed facilities. Baseline street poles are smooth, round, and tapered. Light poles within the clear zone require aluminum transformer bases. These lighting styles may also be used on bridges, when warranted. Example photographs are presented below.

Enhanced Treatment Options:
Enhanced treatments for freeway and interchange lighting are limited and generally discouraged by ODOT due to safety concerns as well as construction and maintenance costs. On occasion, ODOT may consider painting a truss arm pole or replacing a conventional pole with a davit-style pole to match an established or desired corridor theme. ODOT does not apply paint or other aesthetic treatments to high-mast lighting.
Enhanced treatments for street lighting include a range of pole styles, luminaire styles, and color treatments. Typically, these enhancements are used in combination with other aesthetic enhancements in gateway corridors and gateway interchanges, or municipal downtown areas or entertainment/business district areas. Several examples of lighting enhancements that have been used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are included on the following pages.

Enhancement Example: I-280 Bridge Over Maumee River, Toledo. This photograph shows an example of a davit style light pole and shoebox luminaire (on an ODOT freeway bridge) that were painted white to match other enhanced treatments in the corridor (railing, sign supports).

Enhancement Example: Easton Way at I-270, Easton (Columbus). This is a truss arm conventional light pole and cobra head luminaire painted blue to match other aesthetic treatments in the corridor (signals, sign poles).

Enhancement Example: Avery Drive at US 33, Dublin. This example shows a basic light pole with a shoebox luminaire and LED lamp painted brown.

Enhancement Example: US 42, Downtown Lebanon. This is an example of a special decorative post-top light pole and lantern style luminaire.

Enhancement Example: SR 129 Bridge Over Great Miami River, Hamilton. This is an example where decorative street lighting was installed for lighting purposes and a second set of decorative lighting was installed for aesthetics. All light poles and luminaires were painted a charcoal gray color to match the bridge railing and traffic signals on each end of the bridge.

Enhancement Example: SR 747 Over I-71, Mason. This is an example where low-wattage decorative lighting was installed as a local enhancement on an ODOT bridge for aesthetic purposes only. There is no adjacent street lighting or interchange lighting of any type at this location. Note: Maintenance work over traveled lanes must be considered with all parapet and pilaster light supports.

Continued
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Interchange lighting is based on illumination needs for specific areas and therefore is not necessarily in a uniform or linear arrangement. From an aesthetic standpoint, the primary goal for interchange lighting is to blend in with the natural background and avoid the appearance of clutter. Continuous freeway lighting, on the other hand, is typically linear and consists of numerous evenly-spaced poles. The aesthetic goal for continuous lighting is to create the subtle, signature rhythm that is unique to urban corridors and travelers are accustomed to seeing, particularly at night. The aesthetic goal for local street lighting is to be noticeable and memorable, either on its own or as part of a broader, unified aesthetic treatment plan that includes other elements, such as traffic signals, sign supports, and landscaping.

Enhancement Example: Monument Avenue Bridge Over the Great Miami River, Dayton. This is a unique decorative light pole style for bridge aesthetics and pedestrian lighting on the bridge.

Enhancement Example: Decorative Light Pole Base. This is an example of a typical black light pole base used for decorative lighting.

Decorative street lighting can also be elegant, and an important part of a sophisticated aesthetic design plan.

Enhancement Example: Monument Avenue Bridge Over the Great Miami River, Dayton. This is a unique decorative light pole style for bridge aesthetics and pedestrian lighting on the bridge.

Low-mast median lighting can provide an appealing visual rhythm to a highway corridor, especially at night.

Decorative street lighting can be bold and make a visual statement.

Decorative street lighting can help unify some aesthetic treatments (fence, railing) and contrast others.
Special Funding and Maintenance Considerations: Chapter 2 provides an overview of funding and maintenance considerations and responsibilities regarding baseline and enhanced treatments. Similar to traffic signals (Section 5.2.7), there are a number of funding and maintenance considerations and requirements involved with lighting, based on location/jurisdictional boundaries, desired levels of aesthetic enhancement, functional need, and proprietary design considerations. Designers and local stakeholders should refer to TEM Part 1 (Chapter 100) and Chapter 1100 for details and discuss considerations with ODOT early in the design process.

ODOT Steel Light Pole Requirements: Per TEM Section 1120-5, ODOT has developed a list of approved steel decorative light poles. Only poles listed may be specified for decorative lighting on projects that use Federal and/or State monies. The use of alternate or proprietary bids does not provide an exception. Foundations and conduits for non-approved poles provided by local jurisdictions at their own cost are not eligible for participation.

Local Design Standards: Per TEM Section 1106-3, since local jurisdictions may have different lighting criteria than the TEM, to facilitate coordination, the local jurisdiction must provide ODOT with the approved policy, ordinance, or established lighting standard prior to beginning design of a project. Per TEM Section 1130-6, when a local jurisdiction desires to maintain aesthetic consistency for existing street lighting systems by using distinctive unit designs or by painting light poles, specific justification for such designs shall be submitted for ODOT approval before Federal funds are authorized. In general, such justification must demonstrate that the jurisdiction is not requesting Federal funding for designs which exceed the jurisdiction’s own standard, and that the distinctive design is used consistently through a reasonably large or historical area within the jurisdiction.

Environmental Considerations: Per TEM Section 1103-4 and Section 1107-4, designers should consider adjacent land uses when developing lighting plans. Residential and agricultural areas can be sensitive to bright highway lighting, particularly high-mast lighting. Since low-mast lighting will typically light an area in ODOT right-of-way with very little light trespass, it is preferred by ODOT. Designers should coordinate with ODOT if high-mast lighting is being considered, as public involvement will likely be required to gather local input.

Miscellaneous Items: 1) Per TEM Section 1103-6.2, when lighting is provided at intersections, lighting units should be combined with signal and sign supports wherever feasible to minimize clutter and obstacles; 2) Per TEM Section 1103-6.3, lighting pedestrian facilities should be considered for security and aesthetic reasons. Lighting of pedestrian walkways may significantly increase use during the hours of darkness. Lower voltages, vandal-proofing, and safety issues should be taken into consideration; 3) Designers and stakeholders should avoid the use of acorn style luminaires for decorative street lighting due to light trespass and glare that can be distracting to drivers. An example of an acorn-style luminaire is presented in this photograph.

Maintenance Considerations: Per TEM Section 1120-4, if a project will only affect a small portion of an existing lighting system, (i.e., one or two poles) then hardware and luminaires of the same brand as the existing system should be specified in the plan. If a project will affect a larger portion of an existing lighting circuit, the designer should evaluate the situation, and with the agreement of the maintaining agency, require use of the same brand of hardware and luminaire as the existing lighting system; or replace the entire existing system with a different brand of hardware and/or luminaire. This will prevent a lighted area from having different lighting patterns resulting from the use of different brands of luminaires and also prevent a lighted area from having different styles of poles.

Damaged, weathered, or malfunctioning lighting is aesthetically unappealing and may cause driver distraction and potential safety issues. TEM Chapter 1160 provides detailed preventative and as-needed lighting maintenance guidelines. Similar to traffic signal poles, light poles have about a 30-year life expectancy. Other lighting elements have variable lifespans. Repainting light poles and luminaires for aesthetic purposes and to minimize rusting/dischromation will likely be necessary every 10 to 15 years.

Continued
Cost Considerations (Base Year 2017):
The construction cost for a low-mast light pole and luminaire is approximately $4,000. The construction cost for a truss arm conventional light pole and cobra head luminaire is also approximately $4,000. A painted single-arm conventional pole and luminaire will add approximately 5 to 10 percent to the cost. Decorative light poles and luminaires (painted) typically range from $4,000 to $6,000, depending on size and type. LED luminaires cost more to install than non-LED lamps, however, the long-term energy savings is substantial and will quickly offset the additional cost. Repainting light poles after installation can be costly. In some circumstances (such as bridges), the cost of repainting light poles can approach the cost of replacement. Thus, it is crucial that paint is applied correctly by the manufacturer (or contractor) prior to installation to avoid flaking or peeling.
5.2.9 Sidewalks and Buffers

ODOT Design Manual Reference: Location & Design Manual (L&D) Volume 1, 306.2; Construction and Materials Specifications (CMS) 608.3 and 659; Bridge Design Manual (BDM) 209.11.

Overview:
Background Information: Sidewalks provide pedestrians with a dedicated and safe travel route along Ohio’s urban and suburban roadway network. A buffer (also known as a tree lawn or planting strip), is the space between the sidewalk and the adjacent roadway. Providing a buffer can further improve pedestrian safety. On-street parking and dedicated bike lanes can also function as buffers. L&D 306.2 (Figure 306-1E) provides guidelines for where sidewalks are recommended. Figure 306-2E provides cross-section drawing illustrating appropriate sidewalk and buffer widths depending on location and available right-of-way space, including sidewalks with buffer, sidewalks without buffer, and sidewalks in commercial/business district areas. Per BDM 209.11, sidewalks should be provided on bridges where significant pedestrian traffic is anticipated, and/or the approach roadway has sidewalks or requires provisions for future sidewalks. The width of the bridge sidewalk is generally the width of the approach sidewalk plus 12 inches.

What This Section Covers: This section covers sidewalks and buffers in urban and suburban settings, and on bridges. Crosswalks, traffic islands, and medians are discussed in Section 5.2.10. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Sidewalk and buffer locations and widths are per Figure 306-2E in L&D Volume 1. Sidewalks are to be concrete, with joints spaced approximately 5 feet apart. The surface of the concrete is finished per CMS Item 608.03, and must be stable, firm, and slip resistant per L&D 306.2.6. For bridge sidewalks, apply a sealer to match parapet (see Section 5.1.1). Buffers are to be grass, with no plantings. Seed mix per CMS Item 659 (Class 1 lawn mixture).

Baseline: Sidewalk and Grass Buffer
Baseline: Sidewalk - No Buffer
Baseline: Sidewalk in Commercial/Business District
Baseline: Sidewalk on Bridge (Sealed)
Enhanced Treatment Options:
Enhanced treatments for sidewalks typically include: 1) pavement treatments - including alternative pavement types, colors, and patterns, 2) buffer treatments - including trees, flowers, and other landscaping, and 3) special amenities, such as benches, shelters, and trash receptacles. These treatments are typically used in municipalities (business/entertainment districts and neighborhood settings) and gateway bridge crossings. Several examples of decorative (enhanced) sidewalk and buffer treatments used on ODOT/LPA projects in Ohio are presented below. Additional planning, design, maintenance, and cost considerations are presented on the following pages.

Enhancement Example: Downtown Upper Sandusky.
This example includes several sidewalk enhancements common in small communities across Ohio, including brick pavers, benches, trees and shrubs, potted flowers, and decorative lighting.

Enhancement Example: US 23 (High Street), Columbus.
Trees are an appealing sidewalk buffer enhancement when properly maintained. These trees are uniformly mulched around the base as an additional treatment.

Enhancement Example: US 52/US 27 (Ohio River Scenic Byway), Cincinnati. This photograph shows a sidewalk with trees along the curb (right arrow) and decorative plantings on the outside edge (left arrow), separating the sidewalk from the adjacent Ohio River Trail.

Enhancement Example: US 23 (North Fourth Street), Columbus. This is an example of a downtown sidewalk with trees and other planting enhancements (left arrow) along an unobstructed walking zone (right arrow).

Enhancement Example: SR 129 (High-Main Street) Bridge Over the Great Miami River. This bridge sidewalk has both decorative pavers and low-vibration zone (bottom arrows). A pedestrian overlook is also provided (top arrow).

Enhancement Example: Downtown Upper Sandusky. This example includes several sidewalk enhancements common in small communities across Ohio, including brick pavers, benches, trees and shrubs, potted flowers, and decorative lighting.

Enhancement Example: Spring Street Bridge Over I-71, Columbus. This bridge has a number of enhancements, including planters with flowers, shrubs, and trees, and decorative lighting, bus shelters, and trash receptacles.

Continued
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Sidewalks and buffers are important aesthetic elements for numerous reasons. They are located in every community, are clearly visible within a traveler’s (or pedestrian’s) cone of vision, and are an aesthetic element of many front yards or business entrances, and are viewed at “pedestrian speed” as much as highway speed. Consequently, in sidewalk/buffer areas, fine aesthetic details become more relevant than they would be for a noise barrier or a bridge abutment. Thus, the aesthetic goal for sidewalks is to add color and fine shapes and textures to the corridor to enhance the aesthetic qualities of contrast, order, and unity. This is typically achieved through utilizing “green” treatments in buffers (a variety of trees, shrubs, brightly colored flowers, grasses and landscaping mulches), coordinating amenity colors/materials, and incorporating contrasting pavement colors and textures where appropriate.

- **Safety:** Sidewalk amenities located within the lateral offset distances described in L&D Volume 1, Figures 600-3, 600-4, 904-2 and 904-3 are to be crashworthy per AASHTO’s Manual for Assessing Safety Hardware (MASH, 2016). Local jurisdictions may have additional requirements.

- **Pavement Treatments:** Sidewalk widths, grades/slopes, and surface treatments should be designed per L&D 306.2 and BDM 209.11. Local jurisdictions may have additional requirements. Sidewalks and curb ramps should be Americans With Disabilities Act (ADA) compliant. Specialty pavement treatments are often desired for aesthetic reasons; however, bricks, pavers, and stamped concrete have surface irregularities that can pose problems for wheelchair users. When using rough-textured surface treatments, designers should also provide a zone of reduced vibration. It is possible to enhance sidewalk aesthetics while still providing a smooth walking surface by combining a smooth concrete walking area with a decorative edging (see enhancement photographs on previous page). The bumpy brick sidewalk in this photograph may be difficult for wheelchair users to navigate. Trees planted with grates are less likely to cause sidewalk cracks and a rough surface since the grate allows sufficient moisture to reach the tree roots (resulting in a deeper root system). The photograph below shows a tree planted with a grate.

- **Mobility and Accessibility:** Minimum sidewalk widths are established to provide clearance room for pedestrians passing in opposite directions. Placement of utility covers, grates and other covers should be outside of the walking zone to the extent possible. Designers should attempt to locate utilities, light poles, signs, fire hydrants, mail boxes, parking meters and street furniture out of the walking zone. Local jurisdictions may have additional requirements. In this photograph, note narrow walking zone and the number of features impeding mobility in this short segment of sidewalk. They also present a cluttered appearance.

  Designers should also be aware of potential obstacles (tree limbs, sign, other sidewalk/ buffer amenities) that can protrude into the walking zone and not be detectable to a visually impaired person using a walking cane. Tree branches should be maintained to not hang lower than 6.7 feet per FHWA’s Accessible Sidewalk and Street Crossing requirements.

Aesthetic treatments and sidewalk amenities in buffer areas with on-street parking should not be cluttered or be restrictive to accessibility, including blocking car doors from opening or van ramps from deploying. This photograph shows a sidewalk buffer zone with on-street parking that is cluttered and restrictive and does not meet ADA requirements.

Continued
Aesthetic Guidelines – Sidewalks and Buffers

- **Maintenance and Upkeep:** Chapter 2 includes discussion of maintenance responsibilities regarding baseline and enhanced treatments (including sidewalks and buffers). As mentioned above, from an aesthetic standpoint, the level of maintenance and upkeep required along an urban street corridor with pedestrian components usually surpasses that of a high-speed highway corridor. When travelers are moving at slow vehicular speeds, stopped at traffic lights, or walking on sidewalks, pavement cracks, rusted/weathered amenities, peeling paint, dying trees, patchy grass, and litter are very noticeable. Concrete sidewalks can begin cracking shortly after construction and may require replacement within 20 to 25 years. Regular maintenance is critical not only to maintaining a desired aesthetic effect, but also to provide safe and accessible pedestrian mobility, and protect monetary investments. *The sidewalk in this photograph is ugly and non-functional, even with the nice landscaping.*

- **Trees, Shrubs, and Other Plant Material:** Trees and shrubs should be installed per CMS Item 661 and L&D Volume 1, 900, which provide planting guidelines and maintenance recommendations. The following are several planting and maintenance considerations and reminders: 1) watering is critical for tree and shrub survival, particularly in the first few months after planting, and for trees installed in sidewalk wells with grates; 2) consider the cost and logistics of watering large numbers of trees, shrubs, and planters in an urban environment (manual watering versus irrigation systems); 3) plant trees and shrubs in accordance with required setbacks; 4) provide adequate spacing from lighting, signs and other utilities to retain the structures intended function or purpose; 5) avoid tree species that regularly drop nuts or other debris that make walking difficult or hazardous; 6) placing trees and shrubs on bridges is generally discouraged by ODOT, but if utilized, the trees and shrubs should be installed in planters (see the Spring Street example above) and watered frequently; 7) do not use invasive species; the use of non-native species requires ODOT approval; 8) use tree species that are in Ohio Zone 5a or lower (USDA hardness zone), 9) trees, flowers, and grasses placed in decorative pots and planters will require more frequent watering than when planted in the ground. *See Section 5.2.11 (Landscaping) for additional information.*

- **Seeding and Mulching:** Seeding and mulching should be installed per CMS Item 659 and L&D Volume 1, 900, which provide planting guidelines and maintenance recommendations. Grass buffers may also be installed using sod according to CMS Item 660. Watering is critical for seed germination and survival. *See Section 5.2.11 (Landscaping) for additional information.*

- **Coordinating Colors/Materials:** To the extent possible, designers should coordinate the colors and materials used on sidewalk amenities (such as planters, shelters, benches, trash receptacles) to match other aesthetic elements in the corridor (such as decorative light posts, traffic signal supports, and sign posts), which will help aesthetically unify the corridor. *See Section 5.2.10 (Medians, Traffic Islands, and Crosswalks) for additional information.*

**Cost Considerations (Base Year 2017):**
The construction cost for a standard 5-foot wide concrete sidewalk is approximately $55 per linear foot. A minimum 10-foot wide sidewalk in a commercial area is approximately $110 per linear foot. Using a stamped concrete (formliner) pattern on a sidewalk increases the cost by approximately $15 per square foot. Installing bricks or pavers costs approximately $15 per square foot. Resealing concrete elements (with an epoxy-urethane or non-epoxy sealer) costs approximately $3 per square foot. *See Section 5.2.11 for landscaping cost considerations.* Typical sidewalk amenities, such as trash receptacles, benches, and bike racks generally range from $400 to $1200 in cost. Small shelters can range from $5,000 to $10,000 each. Repainting these types of amenities typically costs about $15 per square foot. For smaller amenities, it will likely be more cost-effective to replace them when they become damaged or weathered than it will be to repair and repaint.
5.2.10 Medians, Islands, and Crosswalks


Overview:
Background Information: A median is the portion of the highway separating opposing directions of the traveled way. Per L&D 304.1, the principal functions of a median are to prevent interference of opposing traffic, to provide a recovery area for out-of-control vehicles, to provide areas for emergency stopping and left-turn lanes, to minimize headlight glare and to provide width for future lanes. Per L&D 304.2, the width of a median is the distance between the inside edges of the traveled way. Barrier medians are normally used in urban areas and depressed swale medians are normally used in rural areas. On major streets with numerous business drives, a median consisting of an additional lane, striped as a continuous two-way left turn lane is desirable. A solid 6-inch high concrete median may be used where the design speed is less than 50 mph and where an all-paved section is appropriate, and a wider median cannot be justified. Narrow medians (less than a complete traffic lane), or medians of varying width, on low speed facilities may simply be marked with yellow transverse pavement marking.

Per L&D 401.7, islands are the defined areas between traffic lanes used for control of vehicle movement. Islands serve three primary functions: (1) to control and direct traffic movement, usually turning; (2) to divide opposing or same direction traffic streams usually through movements; and (3) to provide refuge for pedestrians. Channelizing islands control and direct traffic into the proper paths for the intended use and are an important part of intersection design. They may be of many shapes and sizes, depending on the conditions and dimensions of the intersection. Islands can be curbed (concrete or grass), painted, or nonpaved/depressed grass.

Crosswalks provide a designated, marked area for pedestrians to cross streets. Intersection islands can provide space for traffic control devices and an area for pedestrian refuge, particularly in wide intersections with lengthy crosswalks (see L&D 401.8).

What This Section Covers: This section covers roadway medians (longitudinal median barriers are discussed in Section 5.2.2). This section also covers traffic/pedestrian islands and crosswalks. Section 5.2.9 discusses sidewalks and buffers. Additional planning, design, maintenance, and cost considerations are also provided in this section.

Baseline Treatments:
Urban and Rural Freeway/Expressway Medians (Non-Barrier): Depressed grass median. Widths per L&D 304. Seed per CMS Item 659 (Class 2, roadside mixture).

Local Road/Street Medians (Non-Barrier): For medians less than four feet wide, excluding shoulders, the baseline is a 6-inch raised solid concrete median sealed with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778). For medians greater than four feet wide, excluding shoulder, the baseline is 6-inch curbed, raised grass median, seeded per CMS Item 659 (Class 2 roadside mixture). If the length of the median is short, the width of the median varies, or a raised median would prevent desired left turns, then the median may be delineated with appropriate pavement markings.

Continued
Islands: Four baseline types per L&D 401.7: 1) depressed grass; 2) raised grass with 6-inch curb; 3) 6-inch raised concrete with light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778); or 4) painted (per TEM Chapter 301 and OMUTCD Chapter 3B). Dimensions and configurations will vary based on location and site conditions. Seed grass islands per CMS Item 659 (Class 2, roadside mixture). Crosswalks: Solid white (painted) transverse lines with or without solid white diagonal or longitudinal markings per TEM Chapter 301 and OMUTCD Chapter 3B.

Enhanced Treatment Options:
Enhanced treatments for concrete/paved medians, islands, and crosswalks typically involve the use of formliner patterns (or bricks/pavers) and various colored paints or sealers. Enhanced treatments for grass medians and islands typically include special landscaping such as decorative plantings, mulches, and bricks/pavers. Typically, these enhancements are used in combination with other aesthetic enhancements at higher volume intersections, (including roundabouts) in gateway corridors, interchanges, bridge approaches, and entertainment/business district areas. Several examples of enhancements that have been used on ODOT/LPA projects in Ohio are presented below.
Enhancement Example: Morse Road, Columbus. This raised concrete island has a brick formliner pattern with a neutral sealer. Note the reduced vibration zone for pedestrian and wheelchair use. These treatments are used throughout the corridor.

Enhancement Example: Morse Road, Columbus. This raised concrete median has the same formliner and sealer treatments as the traffic island in the previous photo. This example shows the same treatments used across different areas of the corridor.

Enhancement Example: Long Street Over I-71, Columbus. These brick formliner pattern crosswalks are one of many aesthetic treatments utilized around the Long Street bridge crossing over I-71. The pattern in these crosswalks is shallow, providing a limited vibration surface.

Enhancement Example: SR 161 at Riverside Drive, Columbus. This raised truck apron and traffic island include stone formliner pattern to provide an appealing texture and a visual shape that mirrors the roadway curvature in this roundabout.

Enhancement Example: SR 120 (Central Avenue) at Upton Avenue and I-475, Toledo. This raised concrete traffic island uses a brick outline to provide texture, color, and shape. Note how the island was modified to provide new curb cuts and a flat, smooth surface for pedestrian and wheelchair use.

Enhancement Example: SR 5 (Lake Road), Erie. This is an example of a simple raised grass median with mature trees. Mature trees are also located in the buffer area between road and the sidewalk to provide a unified corridor appearance.
Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Similar to sidewalks and buffers (see Section 5.1.9), medians, islands, and crosswalks are important aesthetic elements since they are common in virtually all communities, are clearly visible within a traveler’s cone of vision and are typically viewed at pedestrian speed or low vehicular speed. Thus, the aesthetic goal for medians, traffic islands, and crosswalks is to add color and fine shapes and textures to the roadway corridor to enhance the aesthetic qualities of contrast, order, and unity. This is typically achieved by utilizing various landscaping treatments in medians (a variety of trees, shrubs, brightly colored flowers, grasses, and mulching) and utilizing contrasting pavement colors and textures where appropriate.

- **Safety and Mobility:** L&D 401.8 provides guidance on intersection design to accommodate pedestrians, including curb radii, crossing distances, and crossing islands/medians. TEM Chapter 301 and OMUTCD Chapter 3B outline acceptable pavement marking treatments for islands and crosswalks. Various enhancements can be added to islands and crosswalks including paint and colored or textured pavements (as depicted in the example photographs above), though it is important to note that these types of enhancements may not be appropriate traffic control devices, and proper regulatory markings should also be in place. As with sidewalks, special surface treatments in crosswalks and traffic islands are often desired for aesthetic reasons, however, treatments with surface irregularities can pose problems for many types of pedestrians (wheelchair users, the elderly, bicyclists). When using rough-textured surface treatments, designers should provide a zone of reduced vibration. Rough-textured surface treatments should not be used within crosswalks.
Coordinating Colors/Materials/Designs: A key aesthetic consideration for medians, islands, and crosswalks is coordination of colors, textures, and designs with other aesthetic elements in a roadway corridor or intersection. Medians, islands, and crosswalks are often part of an overall visual “scene” which includes sidewalks and buffers (Section 5.2.9), decorative street lighting (Section 5.2.8), and traffic signals (Section 5.2.7). Unifying aesthetic treatments is important to achieving appealing corridor or intersection appearance. This includes using the same (or similar) pavement colors/textures, plantings and mulches, and overall landscaping designs. For example, if a roadway corridor or intersection has black street light poles, black traffic signal poles, and sidewalk amenities, consider using black decorative mulching to further establish unity. If sidewalks have a red brick trim, consider using red brick trim around traffic island curbs and along median curbs. If sidewalk buffers have a variety of decorative grasses and flowers, consider using the same species in an adjacent median. The important element of contrast will usually be incorporated by default, as plantings (grasses, flowers, shrubs and trees) will inherently provide texture and color contrast to structural treatments, pavement, and mulch.

Freeway/Expressway Medians: Decorative landscaping or other aesthetic enhancements in freeway and expressway medians are uncommon and generally not recommended due to clear zone requirements and regular mowing/maintenance needs. If desired, such treatments are typically incorporated into interchange infields or freeway/expressway backslopes. Further discussion of aesthetic landscaping treatments in freeway and expressway corridors is included in Section 5.2.11.

Maintenance Considerations: Chapter 2 provides an overview of maintenance responsibilities regarding baseline and enhanced treatments (including medians, islands, and crosswalks). Maintenance is important to aesthetics on any structural element. Pavement maintenance consisting of crack repairs, repainting markings, or resealing decorative concrete is not only important to safety and mobility, but is crucial for aesthetics. Pavement markings are typically replaced every 4-5 years (if thermoplastic or epoxy) or annually if painted. Concrete elements such as traffic islands, sidewalks, and crosswalks can begin cracking shortly after construction and may require full replacement every 20 to 25 years. Equally as important, or perhaps more important from an aesthetics standpoint, is landscaping maintenance. Plantings, mulching, and pavers require continual maintenance to provide aesthetic benefits. Cracked or heaving pavers, weathered/discolored mulch, weeds, and withered or dead plantings are easily noticed and substantially detract from the appearance of a treatment design. Yearly maintenance is normally required, and for plantings, monthly maintenance is typically required during the growing season. See Section 5.1.12 for further discussion of landscaping design and maintenance considerations.

Cost Considerations (Base Year 2017):
The construction costs for baseline traffic islands and medians are highly dependent upon the size, shape, and material of the islands. Generally speaking, the major cost drivers of raised grass islands and medians are the curb, any required fill material, and an irrigation system, if provided. The cost of concrete islands and medians will be dependent upon curb and gutter, and the concrete to fill the island. The cost for painted islands and medians will depend on the purpose, size, and location of the island. Approximate costs for items typically used in island and median construction is included below. See Section 5.2.12 for landscaping costs.

- Concrete Curb, Type 6 - $28/linear foot
- Concrete Traffic Island - $12/square foot
- Additional Concrete Formliner - $15/square foot
- Brick Pavers - $15/square foot
- Longitudinal Pavement Marking - $1/linear foot
- Transverse Pavement Marking - $4/square foot
- Island Pavement Marking - $5/square foot

(Intentionally Left Blank)
5.2.11 Highway Landscaping


Overview:
Background Information: The primary purpose of landscaping in highway corridors is to improve the visual appeal of the corridor, either through use of plantings and related treatments, screening unattractive views, or accentuating attractive views. Landscaping can also have functional benefits, such as erosion control, snow control, reducing headlight glare, and reducing maintenance costs. Per L&D 900, safety is a critical consideration with any highway corridor landscaping treatment, particularly trees. L&D 900 provides a number of safety and design guidelines and considerations, including discussion of: 1) landscaping elements and fixed objects, 2) clear zones and diagrams of setbacks, 3) bodies of water, 4) landscaping accessories (planters, benches, etc.), 5) irrigation systems, 6) roadside grading, 7) landscaping opportunities, 8) planting guidelines and constraints, and 9) maintenance. CMS Item 651 through Item 671 provides details and specifications for soil preparation, planting, and maintenance. Key elements are summarized in the Planning, Design, and Maintenance Considerations section.

What This Section Covers: This section covers landscaping within ODOT highway right-of-way (freeway, expressway, and other federal and state routes). *Landscaping associated with urban sidewalk corridors and street medians/traffic islands are is discussed in Section 5.2.9 and 5.2.10.*

Baseline Treatments:
Due to safety considerations, ODOT does not plant trees, grade roadsides for aesthetic purposes, or introduce other landscaping elements into highway right-of-way as a standard practice. For highway corridors, ODOT’s baseline landscaping treatment primarily includes use of various roadside and slope seed mixes as specified in CMS Item 659, combined with reduced backslope and infield maintenance (at select locations), as illustrated in the photographs below. Decorative landscaping in highway right-of-way is typically restricted to gateway interchange projects as aesthetic enhancements sponsored and maintained by local jurisdictions (see Enhanced Treatment section). Further discussion of other treatments, such as ODOT’s pollinator program and living snow fences, are discussed in the Planning, Design, and Maintenance Considerations section. Roundabout landscaping is discussed in Section 5.2.13.

![Baseline: Freeway - Fence-To-Fence Mowing](image1)

![Baseline: Interchange - Reduced Infield Maintenance](image2)

![Baseline: Freeway - Reduced Backslope Maintenance](image3)

![Baseline: Rural Arterial - Reduced Backslope Maintenance](image4)
Enhanced Treatment Options:
Enhancement options for highway landscaping primarily involves decorative treatments at gateway interchanges, special corridor projects, and small areas along the right-of-way fence along commercial or community properties (schools, churches, etc). Most treatments are sponsored by local stakeholders (“permit” projects). ODOT does not allow decorative landscaping treatments in highway clear zone areas (including highway medians) due to safety and maintenance considerations. Landscaping enhancements for sidewalks/buffers and low speed street medians/traffic islands are discussed in Sections 5.2.9 and 5.2.10. Several examples of decorative highway and interchange landscaping that have been used on ODOT/LPA projects in Ohio are presented below. Special programs and treatments such as the pollinator program and installing natural snow fences are discussed in the next section.

Enhancement Example: I-70/I-670 Interchange, Columbus. This interchange has low growing, low maintenance plantings on terraces between ramps.

Enhancement Example: I-75/US 36 Interchange, Piqua. This is a typical community landscaping treatment in a gateway interchange, including a decorative wall (outside the clear zone), small trees, shrubs, and grasses.

Enhancement Example: I-71, Cincinnati. This is a small landscaped area on the backslope of I-71 right-of-way adjacent to an outdoor employee area for a local business.

Enhancement Example: I-75/I-70 Interchange, Dayton. This interchange has numerous aesthetic treatments, including decorative landscaping in infield areas and between ramps.

Enhancement Example: I-75/Austin Blvd. Interchange, Dayton. This photograph shows new landscaping installed in a gateway interchange area, including flowers, shrubs, small trees (not shown), and decorative mulch and pavers.

Enhancement Example: I-75/Austin Blvd. Interchange, Dayton. This is a small landscaped area on the backslope of I-71 right-of-way adjacent to an outdoor employee area for a local business.

Enhancement Example: I-75/I-670 Interchange, Columbus. This interchange has low growing, low maintenance plantings on terraces between ramps.
Aesthetic Guidelines – Highway Landscaping

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Similar to the aesthetic goals discussed in Sections 5.2.9 (sidewalks/buffers) and Section 5.2.10 (medians, islands, and crosswalks) which contain landscaping elements, the aesthetic goal for highway landscaping is to add color, shape, and texture to the roadway corridor to enhance the aesthetic qualities of contrast, order, and unity. Small trees and decorative walls/terraces (installed per ODOT clear zone, setback, line-of-sight, and fixed object requirements), combined with various combinations of shrubs, brightly colored flowers, ornamental grasses, and landscape mulch, can be designed in ways that can be bold and eye-catching, and used as a stand-alone treatment. These treatments can also be subtle and refined and coordinated with other aesthetic treatments to help unify a broader aesthetic plan.

- **Best Management Practices:** There are dozens of do’s and don’ts regarding planning, installing, and maintaining landscaping. Designers and stakeholders should refer to ODOT’s Location and Design (L&D) Manual and Construction & Materials Specifications (CMS) for details and best management practices that have been tested and refined through many years of ODOT project experience. The following are some key highlights (and additional considerations). Each of these is important to aesthetics, since a landscaping plan cannot be installed if it is not safely designed, and will not survive if it not well planned, constructed, and maintained.

**Planning and Design**

- Safety is critical. Follow ODOT clear zone, setback, line-of-sight and fixed object requirements. Fixed objects include trees over 4” diameter (54” above the ground), clusters of small caliper trees and shrubs, retaining walls, and rock formations or other free-standing objects greater than 4” diameter.
- Setbacks may need to be expanded in high-accident areas.
- Avoid constructing bodies of water within right-of-way.
- Irrigation systems must not be a hazard to vehicles or mowing/maintenance. Overspray, sheet flow, or ponding on roadways is not permitted. Systems cannot have exposed pipes or hazardous stub heights.
- Landscaping treatments should not be installed in ditches (with the exception of a standard seed mix).
- Consider the size of trees and shrubs when fully grown. Landscaping must not obstruct billboards, utilities, highway lighting, or signs, hinder snow removal, or cause damage to vehicles or agricultural crops.
- Select appropriate seed mixes (per CMS Item 659 or “special”), and tree/shrub species for the application. Consider salt spray, sun/drought tolerance, shade tolerance, hardness, topography, drainage, and soil type.
- Do not use invasive species. Use of non-native species requires ODOT approval (see L&D 906.1.4). Utilize species native to Ohio whenever possible.

**Additional Considerations:** Consider seasonal planting constraints and project schedule, flower bloom times, duration, and color, and spring/summer/autumn foliage color variations. When establishment time is a concern, consider installing sod (per CMS Item 660) instead of planting a basic roadside seed mix. Consider watering logistics and costs (irrigation systems, transporting water by truck/hand watering). Consider mowing maneuverability when designing landscaping plans. Consider designs that can safely screen unattractive views, or preserve a scenic view.

**Planting**

- Follow soil preparation guidelines in CMS Item 651 through Item 659, including soil analysis, use of lime/fertilizer, aeration, and stockpiling topsoil. Follow seeding and mulching guidelines in CMS Item 659, including watering freshly seeded areas.
- Follow tree and shrub planting guidelines in CMS Item 661 and Item 662, L&D 900, and Standard Construction Drawings LA-1.1 and LA-1.2 including scheduling, transport/storage/handling, planting holes, handling root balls, appropriate planting depths, watering during planting, backfilling, and wrapping/bracing trees.

**Maintenance**

- Regular watering is critical for survival (particularly within the first few months after installation).
- Replace dead or dying trees, shrubs and flowers. Overseed or re-seed bare or patchy areas.
- Install “no mow” and “no spray” signs as necessary.
- Prune trees per CMS Item 666 to maintain desired size/shape, and to remove deadwood and water sprouts.

**Additional Considerations:** Consider replacing decorative mulch yearly and removing weeds (or spraying herbicide) twice per growing season. Adjust mowing schedules and heights according to seed mix specifications. Native flowers and pollinator species typically require higher cutting heights and special mowing schedules.
Aesthetics Design Guidelines – Highway Landscaping

- **ODOT’s Pollinator Program**: Amid increasing concerns over the declines in pollinator (bee and butterfly) populations and health, and the negative impacts these declines have on the agricultural industry and the State’s economy, ODOT has initiated a program to restore and maintain pollinator habitat in its highway right-of-way. A formal statewide implementation plan has not yet been finalized, but ODOT has undertaken a number of test projects (such as this one along SR 207 in Ross County) and has developed new seed mixes that incorporate pollinator species (see CMS Item 659). During project development, designers and stakeholders should consider incorporating pollinator seed mixes into landscaping plans and coordinating with ODOT regarding plan design, funding, and maintenance. A web link to ODOT’s Statewide Roadside Pollinator Habitat Program Restoration Guidelines and Best Management Practices is provided in Appendix C.

- **Natural Vegetation Screening and Snow Fence**: On occasion, ODOT uses landscaping (primarily evergreen trees and shrubs) as vegetative screens instead of noise barriers or as a wind block to reduce snow drifting. Use of vegetative screens in lieu of noise barriers is also discussed in Section 5.2.3. *Note: Vegetative screens do not provide traffic noise abatement.* Planting guidelines are included in L&D 900, Figure 904-1. Similar guidelines for using staggered rows of evergreen trees as a living snow fence are included in L&D 905.4. Designers should consider this treatment in rural project areas with a history of snow drifting problems (typically the west side of highways bordered by agricultural fields). This photograph shows staggered rows of evergreens along the west side of US 30 in Wyandot County.

**Cost Considerations (Base Year 2017):**

Installation and maintenance costs can vary dramatically based on project size, location, the type of landscaping desired, and the vendor. The following is a list of approximate costs that designers and stakeholders may consider when developing a landscaping plan. *Designers and stakeholders should refer to Chapter 2 of this document for a discussion of funding considerations and maintenance responsibilities for baseline and enhanced treatments.*

- Basic Roadside Seed Mix - $3-$5/pound
- Native Grass Seed Mix - $10-$20/pound
- Wildflower/Pollinator Seed Mix - $25-$100+/pound
- Seeding and Mulching - $1-$3/square foot *
- Topsoil - $15-$25/cubic yard
- Decorative Hardwood Mulch - $25-$50/cubic yard
- Decorative Gravel/Stone - $40-$80/cubic yard
- Ornamental Grasses (Potted) - $10-$20 each
- Perennial Flowers (Potted) - $5-$15 each
- Annual Flowers (flats of 6) - $5-$10 each
- Commercial Fertilizer - $500/ton
- Decorative Flower Pots/Planters - $25-$100+ each
- Shrubs (1 to 2 gallon container) - $25-$75 each
- Tree Seedlings (bare root) - $5-$10 each
- Trees (1” Caliper) - $100-$200 each
- Trees (2” Caliper) - $300-$400 each
- Retaining Wall - $50-$100/square foot
- Irrigation Systems - $1,000+ per zone **

** Full systems, including basic infrastructure, can cost $50,000+"
5.2.12 Utilities

ODOT Manual Reference: Bridge Design Manual (BDM) 201.3 and 301.7, Real Estate Manual (REM), Section 8100 through Section 8400

Overview:

Background Information: Overhead and underground utility lines are frequently located within ODOT right-of-way or cross ODOT right-of-way. Along roadways, overhead utility lines have a significant effect on the aesthetics of the corridor. At bridge crossing locations, the placement of utilities can affect bridge aesthetics. REM 8100 describes ODOT’s policy and guidelines for utility crossings or occupation of right-of-way. BDM 203.1 and 301.7 and REM 8108 describe ODOT’s policy and guidelines for placing utilities on bridges.

The linear nature of utility lines and utility service needs often necessitate association with roadway corridors from a land use and economic perspective. Furthermore, there are rarely practical and cost-effective options for removing overhead utility lines from a traveler’s line-of-sight. As part of roadway or bridge projects, designers generally have three options for improving overhead utility aesthetics: 1) relocating utilities away from a roadway corridor, 2) burying utilities underground, or 3) consolidating utilities on one set of overhead poles (“joint use”). Due to cost and/or right-of-way considerations, utility relocation away from roadways and burying utilities are generally not feasible or cost effective and not frequently utilized. These methods are typically considered to be enhancements.

What This Section Covers: This section summarizes ODOT’s baseline treatments for visible (overhead) utility lines located parallel to roadways and at bridge crossings. See the Baseline Treatments, Enhanced Treatments, and Planning, Design, Maintenance Considerations, and Cost Considerations sections below for additional information.

Baseline Treatments:

Bridges: Baseline treatments are specified in BDM 203.1 and 301.7, and REM 8108. In summary, avoid placing utilities on bridges whenever possible. Utilities should not be placed on the fascia of bridge decks. Utilities shall not be suspended below the bottom of the superstructure or attached directly to the deck. If no other options are available, utility conduits (other than gas/water) may be embedded in bridge sidewalks (preferred), or behind the fascia beam.

Roadways (Parallel Overhead Lines): Consolidate aerial (overhead) lines on one set of poles (“joint use”) whenever possible.

Enhanced Treatment Options:

Enhanced treatment options for overhead utilities primarily include relocating lines away from a roadway corridor or burying lines underground. Neither option is used frequently, due to right-of-way and cost limitations. However, situations that may necessitate use of one or both of these options include: 1) visual or physical impact avoidance or minimization in a scenic or environmentally-sensitive area or 2) special public/stakeholder request, including land developers.
Aesthetic Design Guidelines - Utilities

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** In many roadway corridors, overhead utilities provide a substantial amount of visual clutter, as illustrated in this photograph. This is particularly true in urban corridors that are not limited-access facilities. Since there are no aesthetic treatments that can be physically applied to overhead utility lines, and burying or relocating lines is typically not feasible or cost effective, the primary aesthetic goal for utility lines in most circumstances involves reducing the amount of visual airspace occupied by lines (through joint use of single poles, as mentioned above) and replacement of damaged or severely weathered poles. For bridges, the aesthetic goal is simply to avoid placing utilities on bridges, or on visible portions of bridges.

- **Additional Bridge Guidance:** Per REM 8108.02, utility installation on a bridge shall not inhibit maintenance, reduce vertical clearance, or detract from the visual appearance of the bridge. Placement of any utility on a bridge must be approved by the District Production Office, the District Utility Coordinator, and the appropriate ODOT bridge office. The placement of utilities on a bridge, or concealed within a bridge, will only be permitted if there are no other reasonable alternatives.

- **Additional Overhead Utility Guidance:** Per REM 8107.01, longitudinal overhead utility lines are generally not permitted within limited-access highway right-of-way. Per REM 8107.2, on non-limited access highways, longitudinal utility lines shall be located as close to the edge of right-of-way as possible.

- **Scenic Considerations:** Per REM 8110, overhead utilities are to be avoided in scenic areas, such as parks, recreational and wildlife areas, and historic areas, unless there is no other feasible or prudent alternative, and placement underground is not technically feasible or cost feasible. If overhead lines must be installed, the design and materials used must give the greatest weight to aesthetics.

- **Maintenance Considerations:** Maintenance of utilities in ODOT right-of-way is normally the responsibility of (and typically at the discretion of) the utility provider. This is also typically the case within local jurisdiction right-of-way, provided there are no special utility easement/maintained agreements. ODOT reserves the right to require utility providers to perform maintenance on utility line elements that may pose a danger or risk to the traveling public.

Enhancement Example: US 22 at I-71, Cincinnati. Utility lines buried underground along US 22 (Montgomery Road) near I-71 and the Kenwood Mall.

Enhancement Example: Austin Boulevard at I-75, Dayton. Utility lines buried underground along Austin Boulevard near I-75 and Austin Landing.
Cost Considerations (Base Year 2017):
The costs for relocating or burying utility lines are extensive and greatly vary based on a number of factors, including utility type. When an ODOT roadway project requires the replacement of utility poles or relocation of utility lines, the cost is normally borne by the utility owner if the utility is placed within the right-of-way. ODOT or the local owner of the right-of-way will acquire additional right-of-way necessary to provide an adequate space for the utility relocation. If the utility is located within a privately-owned utility easement, typically the relocation cost is included as part of the project cost. This is generally true for LPA projects as well, unless another agreement is in place between the utility and the LPA.
5.2.13  Roundabouts

ODOT Manual Reference:  Location & Design Manual (L&D), Volume I, 401.2.3, 403, 900

Overview:
Background Information: Roundabouts are circular intersections with specific design and traffic control features. These features include yield control of all entering traffic, channelized approaches, and appropriate geometric curvature. The term “modern roundabout” is used to differentiate today’s roundabouts from the non-conforming traffic circles that have been in use for many years. Modern roundabouts range in size from mini-roundabouts with inscribed circle diameters as small as 45 feet to multi-lane roundabouts with inscribed circle diameters up to 180 feet.

Since modern roundabouts are similar in overall design and layout, from an aesthetics standpoint, landscaping treatments in the central island and splitter islands are the focal points for various aesthetic treatments. Additionally, per ODOT’s Traffic Engineering Manual (TEM), all roundabouts require overhead street lighting, which can be designed with aesthetics in mind. Design guidelines for roundabout lighting are specified in TEM 1140-4.6.10. Design guidelines for splitter islands are covered in L&D 403.4.10 and landscaping for roundabouts is covered in L&D 900.

What This Section Covers: This section summarizes aesthetic treatments for roundabouts, focusing primarily on the central island. Discussion of aesthetic treatments for street lighting is provided in Section 5.2.8 of this document, and discussion of aesthetic treatments for traffic islands (including landscaping) are provided in Section 5.2.10. Landscaping for highway projects is discussed in Section 5.2.11. See the Baseline Treatments, Enhanced Treatment Options, and Planning, Design, Maintenance Considerations, and Cost Considerations sections below for additional information.

Baseline Treatments:
ODOT’s baseline treatments for the central island in roundabouts are loosely defined in L&D 905.3.3 and essentially consists of a low earthen mound with enough plantings to achieve the purposes outlined in L&D 905.3.3, including but not limited to: making the central island conspicuous, blocking driver sight through the roundabout, reducing headlight glare, and discouraging pedestrian traffic. As a general rule, ODOT’s baseline planting treatments for the earthen mound includes grass or basic black/brown hardwood mulch and the minimum number of plantings (grasses, flowers, low-growing shrubs, and small trees) necessary to achieve the line-of-sight goals described in L&D 905.3.3. The truck apron is the transversable area surrounding the central island. The baseline treatment for the truck apron is to match the material, color, and texture of the splitter islands. The exception to this treatment is if the splitter islands are landscaped, in which case the truck apron should be concrete.
Enhanced Treatment Options:
Enhanced aesthetic treatment options for roundabout splitter islands and central islands include special mulches, decorative gravel/stones, bricks and pavers, small walls, signs and logos, and elaborate plantings. Example photographs from several ODOT/LPA roundabout projects in Ohio are provided below. Additional planning, design, cost and maintenance information are also provided below.

Planning, Design, and Maintenance Considerations:

- **Aesthetic Goal Summary:** Similar to medians and traffic islands (see Section 5.2.10), the aesthetic goal for roundabouts is to add color, shape, and texture to the roadway corridor to enhance the aesthetic qualities of contrast, order, and unity. This is typically achieved through utilizing various landscaping treatments in the splitter islands and central island (a variety of trees, shrubs, brightly colored flowers, grasses, and mulching) and utilizing contrasting pavement colors and patterns where appropriate.

- **General:** Per L&D 403.2, roundabouts can be placed at an intersection under any type of operational control. Due to improved safety, operation and capacity benefits of roundabouts, a roundabout may be evaluated at any intersection considering signal control to see if a roundabout would be beneficial.

- **Large Roundabouts:** Since roundabouts (particularly large, multi-lane roundabouts) can be visually challenging for drivers, bicyclists, and pedestrians, per L&D 401.2.3 designers should implement a phased approach on multi-lane roundabouts if the single lane construction of the roundabout can meet acceptable levels of service based on opening day traffic. When using a phased approach, it is important to design the full-build layout footprint to ensure right-of-way is secured for future improvements, and landscaping in the center island for the full-build layout should be in place when the roundabout is opened to traffic.

Continued
 **Splitter Islands:** Per L&D 403.4.10, splitter islands should be provided at all roundabout approaches. Their purpose is to provide refuge for pedestrians, assist in controlling speeds, guide traffic into the roundabout, physically separate entering and exiting traffic and deter wrong-way movements. Baseline and enhanced aesthetic treatments can be applied to these islands as described above and in Section 5.2.8. Typically, a portion of the splitter island is situated within the critical sight triangles (see L&D 601). Landscaping treatments must be designed and installed accordingly.

 **Central Island - Hazardous and Fixed Objects:** Per L&D 905.3.3, when the posted speed on any approaching leg to the roundabout is greater than 35 mph, landscaping enhancements such as concrete, stone, or wood walls and trees having a mature diameter greater than 4 inches are prohibited within the central island. Where the approaching legs to a roundabout have a posted speed of 35 mph or less, short walls or other “fixed” objects may be used, but they are to be constructed with materials and in a manner that is not hazardous to errant vehicles (see L&D 905.3.3 for additional details; note that local specifications may differ from ODOT specifications). Designers and stakeholders should avoid placing items in the central island that may be considered an attractive nuisance or might distract drivers from the driving task. When reasonable, designers should include a frost proof water supply (small hand hydrant, not fire hydrant) and electrical supply to the central island. The water supply should be considered for long term use and not just to establish plant material.

 **Truck Aprons:** Truck aprons are typically used to provide additional transversable area around the central island to accommodate larger vehicles. The appearance of the truck apron should match the appearance of splitter island hardscape; however, it should be visually different than the sidewalks if possible, to discourage pedestrian movements across the circular roadway. Truck aprons should also contrast the circular roadway pavement to emphasize the central island.

 **Additional Design Considerations:** Below is a summary of additional design considerations and issues to consider (and avoid) when planning and designing roundabouts for ODOT projects or projects with ODOT involvement (note that local design specifications may differ from ODOT specifications).

 **Cost and Maintenance Considerations:** General cost and maintenance considerations applicable to enhanced aesthetic treatments in roundabouts are covered in Section 5.2.8 through 5.2.11 of this document.
5.3 AESTHETICS AND ENVIRONMENTAL COMMITMENTS

As discussed in Chapter 2 of this document, ODOT may use aesthetic enhancements to minimize or mitigate environmental impacts. ODOT may decide to make these measures environmental commitments, which could be incorporated into project plans for implementation. Most ODOT environmental commitments are made during the NEPA process in response to public/stakeholder involvement, agency review comments, or internal environmental reviews (through ODOT’s NEPA Assignment agreement with FHWA) and mitigate project impacts on sensitive environmental resources.

Such resources include Section 106 historic properties, Section 4(f) properties (including, but not limited to, public parks, public recreational trails, and historic sites), scenic rivers, and areas with traditionally underserved populations. Noise impacts, abatement measures, and related aesthetics are discussed in Section 5.2.3 of this document. Examples of environmental commitments incorporating aesthetic treatments include:

- Installing special landscaping (earthen mounds, decorative plantings, and fencing).
- Constructing decorative railings, retaining walls, or retaining walls using decorative formliners.
- Refurbishing historic bridges.
- Salvaging historic structural/engineering elements and displaying them in special areas with sidewalks, landscaping, and informational plaques/kiosks for public viewing.
- Designing informational kiosks, plaques, or concrete formliners with images, phrases, and logos to commemorate specific people, historical events, community history, or ethnic history and incorporating them into sidewalks, overlooks, retaining walls, bridge abutments, or other transportation elements.
- Refurbishing playground/park equipment, adding decorative mulching, plantings and/or other amenities.
- Removing vegetation to enhance a scenic view or area or adding plantings to shield unattractive views.
- Using “green” techniques such as natural channel design and living walls instead of concrete or rock.

A few examples of mitigation measures are presented below. Additional examples can be found in Chapter 6 of this document (Case Studies) and in ODOT’s environmental guidance manuals.
This is an example of a community history commemoration on a concrete bridge abutment (see also Section 6.1).

Many landscaping treatments were part of the relocation of SR 664 at Old Man’s Cave in Hocking Hills State Park (see also Section 6.2).

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CHAPTER 6: CASE STUDIES

6.1 CASE STUDY: THIRD STREET BRIDGE

| ODOT CRS and PID: | MOT-THIRD-04; PID #95393 |
| ODOT District:    | 7 |
| County / Municipality: | Montgomery County, Dayton |
| Timeline:         | Construction in 2022 |
| Construction Cost: | $21,216,735 (ELLIS) |
| Key Stakeholders: | Montgomery County, City of Dayton, ODOT, Local Community |
| Aesthetic Focus:  | Traditionally Underserved Populations |

Project Description:
The MOT-THIRD-04 project involves replacement of the Third Street bridge over the Great Miami River in Dayton, Ohio. The existing bridge was constructed in 1900 as a seven-span spandrel-filled arch. In 1949, the bridge underwent a major rehabilitation which replaced the arches with the present-day continuous steel girders on the original piers and abutments. The bridge has a length of 721 feet. The existing bridge has two travel lanes in each direction with a 4’ raised center median and 8’ sidewalks. The proposed replacement bridge is a 5-span concrete I-beam superstructure with wall-type piers and abutments. The new bridge will have two travel lanes in each direction, a center turn lane, a 10’ sidewalk on the north side and a 17’ multi-use path on the south side.

Context and Aesthetic Objectives:
Context: The Third Street bridge project area has a rich cultural and ethnic history, including ties to our country’s aviation pioneers and the Civil Rights Movement of the 1960’s. Notable persons associated with this area of Dayton include Paul Lawrence Dunbar (African-American poet and influential author), the Wright Brothers, and Dr. Martin Luther King Jr. In their youth, Paul Lawrence Dunbar and Orville Wright attended the same school in west Dayton and became lifelong friends. The Dunbar House, Wright-Dunbar Historic District, and Dayton Aviation Heritage National History Park are all located on the west side of the Great Miami River, within a mile of the Third Street bridge. Though the Third Street bridge is officially named “the Peace Bridge”, it is also known as “the longest bridge in Dayton,” symbolic of the long distance and socioeconomic disparity between the west side of the river (historically a low income, minority area) and the east side of the river (historically a white, affluent area). Though the Great Miami River has always been a natural barrier in Dayton, construction of I-75 in the 1960s added a new structural barrier that further magnified the physical separation and racial and economic divide between the east side and the west side. Over time, the community has attempted to reunite east and west. Renaming the Third Street bridge “the Peace Bridge” was one such effort. Other ongoing unification efforts are the annual Dayton Peace March organized by the Dayton Peace Bridge community group, as well as the annual Martin Luther King Day march that crosses the Peace Bridge.

Aesthetic Objectives: Considering the historic context of the area, the aesthetic objective for the Third Street bridge project is to promote the themes of peace and unity, which is considered by the project team, local stakeholders, and the public to be instrumental in healing relationships and joining communities on each side of the river. This is being accomplished through incorporation of pedestrian facilities, informational and commemorative panels reflecting the history of the area, and elegant decorative lighting. Local architecture from the current and previous Third Street bridge, adjacent Great Miami River bridges, the Wright-Dunbar Historic District, and the nearby Dayton Art Institute are being used for design and aesthetic inspiration.

Aesthetic Treatments:
Though the Third Street bridge project will not have any direct adverse impacts on Traditionally Underserved Populations, it became apparent early in the project study that the bridge itself was a divisive feature and utilizing public involvement to help design special treatments to address this divisive issue would be crucial to project success. Thus, an aesthetic plan was developed through extensive public involvement and was vetted through an aesthetic committee comprised of project team members and community participants.

Continued
The Montgomery County Engineer’s Office (MCEO) also hired a well-known local artist to assist with aesthetic design reviews and to communicate with the aesthetics consultant, the public, and the design team. Special aesthetic treatments incorporated into the project design include: 1) decorative fascia girder treatments, 2) decorative parapet/pedestrian railing designs, 3) decorative pier design, 4) pedestrian overlooks and respite areas, 5) images and inspirational quotes from notable local persons (Dunbar, Wright Brothers, Dr. King) on piers and abutments, 6) stencil patterns on sidewalks, 7) information panels (with web links for additional information and other local attractions), and 8) decorative street and bridge lighting (see photographs below and on next page).

Project Challenges, Key Takeaways, and Lessons Learned:

Though this project will not be constructed until 2022, project team representatives identified several key takeaways and lessons learned from this project’s aesthetic design process:

- **Aesthetics Scoping:** Consider aesthetics early in the project development process, even during scoping. Reach out to local stakeholders for assistance. Early stakeholder coordination, early identification of environmental issues and/or aesthetic needs, and accurate scoping simplifies the public involvement and design process and can be important to project funding (including aesthetics funding).
- **Assembling a Specialized Team:** For a project of this complexity, consider hiring an aesthetics consultant, also consider hiring a local artist and/or historian to help “speak the language” and communicate aesthetic themes and local preferences to the design team.
- **Public Involvement:** Allow the public to drive the aesthetic design process (particularly on projects of this nature with social and environmental sensitivities) but be open and transparent with engineering and funding constraints.

![Third Street Bridge](image1.jpg)
![Third Street Bridge – Early 1900’s](image2.jpg)
![Third Street Bridge - Existing](image3.jpg)
![Proposed Third Street Bridge](image4.jpg)
![Proposed Respite Area; Dunbar Image/Quote](image5.jpg)

Continued
Proposed Special Pier Treatments

Great Miami River Trail Under Proposed Third Street Bridge

Proposed Pedestrian Overlook and Stencil Art

Proposed Illuminated Respite Area at Dusk

Proposed Decorative Bridge Lighting at Night

Proposed Decorative Bridge Lighting at Night

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6.2 CASE STUDY: SR 664 RELOCATION AT OLD MAN’S CAVE

ODOT CRS and PID: HOC-664-4.08; PID #85123
ODOT District: 10
County / Municipality: Hocking County, Hocking Hills State Park
Timeline: 2010-2014
Construction Cost: $7,293,866 (ELLIS)
Key Stakeholders: ODOT, ODNR, Friends of Hocking Hills State Park
Aesthetic Focus: Section 4(f) Impacts; Natural Park Setting; Recreational Experience

Project Description:
The HOC-664-4.08 project is located along SR 664 in Hocking Hills State Park at Old Man’s Cave. In this area, SR 664 is designated a National Scenic Byway. This project was an ODOT/ODNR joint venture to relocate approximately 4,000 feet of SR 664. ODOT and ODNR collaborated with the Friends of Hocking Hills State Park, a non-profit group that provided funding contributions and assisted with planning. The primary purpose of the project was to correct geometric deficiencies and move the road north of the visitor parking areas (further away from the park’s natural features). This would address a critical safety issue by eliminating the need for visitors to cross SR 664 to access the park. The project also included: 1) combining access points and reconstructing intersections, 2) constructing a new pedestrian path and sidewalks, 3) redesigning the visitor center plaza/entrance, 4) minimizing high-quality stream impacts using special culvert designs, and 5) redesigning the storm water treatment system.

Context and Aesthetic Objectives:
Context:
With over 2 million visitors annually, Hocking Hills State Park is the fourth most visited state park in Ohio. The park includes attractions such as Ash Cave, Cantwell Cliffs, Cedar Falls, Conkle’s Hollow, Old Man’s Cave and Rock House. The Old Man’s Cave area was the first to be acquired by ODNR (1924) and remains the most popular visitor destination. The area also contains most of the park’s facilities, including the campground, cottages, dining lodge, and visitor’s center. Scenic attractions include unique rock formations, waterfalls, caves, cliffs, and gorges, all carved in sandstone and shale bedrock. The original location of SR 664 at Old Man’s Cave created an undesirable safety condition, as well as an unnatural park experience for visitors. The lack of a well-defined entrance and transition from vehicle to pedestrian-oriented spaces created a confusing and dangerous situation. A planned expansion of the Old Man’s Cave visitor’s center (2019) would exacerbate the problem. To address these issues, a more pedestrian-friendly infrastructure was needed. Since Hocking Hills State Park is a publicly-owned recreational area, Section 4(f) regulations apply for federally-funded transportation projects, such as HOC-664-4.08.

Aesthetic Objectives:
Though the primary purpose of the HOC-664-4.08 project was to address safety issues, ODOT, ODNR, and the Friends of Hocking Hills State Park also recognized that enhancing the park’s natural setting and recreational experience for visitors were crucial to the success of the project and were important goals for the project. Due to this, the project included a number of design and aesthetic treatments intended to protect the area’s natural and geologic features, address environmental issues related to runoff, noise, and erosion, and improve the visual character of the area, the natural park setting, and the recreational experience for visitors. These treatments are summarized below and in the photographs on the next page.

Aesthetic Treatments:
Aesthetic treatments were incorporated into the project design to address the goals listed above, and included: 1) substantially raising the elevation of relocated SR 664, 2) utilizing the natural terrain and aesthetic grading to soften curves and slopes, 3) constructing earthen mounds to reduce highway visibility and traffic noise, 4) planting clusters of evergreen trees for visual screening, 5) utilizing the old SR 664 alignment for a new pedestrian path, 6) installing decorative wooden railing along the new pedestrian path, 7) constructing a new park entrance sign and landscaping, 8) constructing storm water infiltration trenches and bioretention cells with educational information displays, 9) installing extensive landscaping using native species (seed mixes, trees) and decorative hardwood mulch, and 10) redesigning the visitor center plaza area with ADA-compliant sidewalks, a new bus loading/unloading zone with colored concrete, and a new outdoor eating area surrounded by decorative stone seat-walls and stone piers that match stone piers at the park entrance. Due in large part to these measures, ODOT determined that a de minimis Section 4(f) impact finding was appropriate for this project.

Continued
Project Challenges, Key Takeaways, and Lessons Learned:

- **Cooperation:** The entire project design process had to be completed in about 9 months. Executing this challenging schedule required the utmost cooperation among team members. A key factor was all parties agreeing to and upholding “over-the-shoulder” reviews and reduced review times.

- **Prioritizing Aesthetics:** For this project to be successful, every aspect of the project design had to be geared toward the enjoyment of the end user: park visitors. Once the fundamental design aspects of the project were established (safety, accessibility), aesthetics and the environment had to be considered for every detail to minimize impacts and create a natural, visually appealing, and unified appearance - from analysis of dozens of sight lines to hand picking native species, and from construction and traffic management to crafting an educational experience through storm water bioengineering.

- **Interdisciplinary Team:** Landscape architects and local stakeholders (notably the Friends of Hocking Hills State Park) were actively part of the project team, and through their hands-on work with engineers, were instrumental in prioritizing aesthetics and helping achieve the project’s design goals.

### Case Study – SR 664 Relocation at Old Man’s Cave

- **New Entrance Sign and Landscaping**
- **New Pedestrian Path**
- **Storm Water Bioretention Cell**
- **New Pedestrian Path and Railing**
- **Relocated SR 664, Evergreen Screen, and Tree Plantings**
- **ADA-Compliant Sidewalk; Bus Loading/Unloading Zone**

*Continued*
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Project Description:
The I-70/I-75 interchange was originally constructed in the 1950’s with a cloverleaf design. The next interchange to the south on I-75 just south of Little York Road had a modified diamond design with ramps tying into parallel local roads (Poe Avenue and Miller Lane). By the late 1990’s, the antiquated cloverleaf design of the I-70/I-75 interchange was no longer capable of safely and efficiently handling the large volume of vehicles passing through each day. To address this issue, a full interchange rebuild project with modern directional and flyover ramps was constructed by ODOT in the mid 2000’s (PID #19069 and PID #19070). Due in part to its proximity to the I-70/I-75 interchange, the Little York Road/I-75 interchange was closed, and a new interchange was constructed approximately one mile to the south at Beechwood Road (PID #18249).

Context and Aesthetic Objectives:
**Context:** The Dayton area is often referred to as the “Crossroads of America” due to its location and since it is easily accessible by land and air. Positioned near the intersection of I-70 and I-75, the Dayton area is strategically located within 600 miles of over 50 percent of the U.S. population. To underscore this point, as this project was being planned and designed, the I-70/I-75 interchange was handling over 150,000 vehicles per day with a projected growth of 65 percent over the next 20 years. In addition to handling this exceptional traffic volume and improving safety (by eliminating cloverleaf weaving movements and improving interchange spacing), the new interchange was expected to spur economic development and provide a strategic boost to the Dayton International Airport toward becoming a key logistics and distribution center (the airport is located approximately 2 miles away from the I-70/I-75 interchange). Additionally, Dayton is also often referred to as “The Birthplace of Aviation”, and the I-71/I-75 interchange is located less than 10 miles away from the Wright Brother’s childhood home, the Huffman Prairie Flying Field (where the Wright Brothers’ early test flights occurred), the Wright-Dunbar Historic District (see also Section 6.1), the Dayton Aviation Heritage National Historical Park, and the Wright-Patterson Air Force Base.

**Aesthetic Objectives:** The I-70/I-75 interchange is an example of a major “gateway” interchange, since it occurs at the junction of two heavily-traveled freeways, it is located at a primary entrance point to the City of Dayton, and it is adjacent to the Dayton International Airport. Considering the gateway characteristics of the interchange, its modern, eye-catching design featuring long, sweeping curves and concentric flyover ramps, and its proximity to a commercial airport, an Air Force base, and the epicenter of the Wright Brothers’ pioneering flight achievements, ODOT sought to develop an aesthetic treatment plan that would be fitting of a major gateway interchange, would pay homage to Dayton’s storied aviation and aerospace history, and would leave a lasting visual impression on travelers. ODOT’s project team invited the public and area stakeholder to participate in the development of the specific aesthetic treatments for the interchange. Further discussion of public and stakeholder participation is provided below. The aesthetic treatments are also summarized below and illustrated in the photographs on the next pages.

**Aesthetic Treatments:**
Initial ODOT/stakeholder coordination meetings established the aesthetic theme for the project - “Innovation Takes Flight”. This theme was based on the aesthetic context of the Dayton area and the aesthetic objectives summarized above and was applied not only to the I-70/I-75 interchange, but also to the new Beechwood Road interchange, and short sections of I-70 east and west of the I-70/I-75 interchange (for corridor unity).
Specific aesthetic treatments consisted of the following: 1) a coordinated color scheme that utilized bold blue bridge girders (“Air Force blue”) and light-neutral epoxy-sealed or gray epoxy-sealed concrete elements; 2) decorative T-Type bridge piers with gray fighter jet pictographs (on flyover ramps) or gray fractured fin formliner patterns; 3) gray fractured fin patterned abutment walls and retaining walls (to match bridge piers), or smooth retaining walls with Wright Brothers’ flyer and aerospace-themed pictographs; 4) mulched and concrete-outlined landscaping beds with various curved shapes that mimic the flow of the interchange ramps and the shape of the infield areas; 5) a variety of flowers, shrubs, and small trees planted in the landscaping beds; 6) regularly mowed infield grass; and 7) gray ashlar block noise barriers.

Project Challenges, Key Takeaways, and Lessons Learned:

- Public/Stakeholder Involvement: ODOT’s project team engaged local stakeholders early in the project to establish the aesthetic theme for the project. As the project progressed, ODOT held public involvement meetings at key PDP coordination points and held several “charrettes” to establish the aesthetic details of the project. Charrettes are focused workshops that explore ideas, opinions, issues, and constraints to achieve consensus and make decisions. Representatives from ODOT’s project team, local jurisdictions, local businesses, and area neighborhoods participated in the charrettes. According to ODOT, a local artist and a representative from a nearby community involved in another interchange aesthetics project also participated. At these charrettes, ideas and concepts were openly discussed, renderings and preliminary drawings were viewed, and votes were taken to continuously refine the plan. ODOT project team members that were involved in the charrettes stated the process was smooth, effective, and valuable in developing the aesthetic treatment plan and to the overall success of the project.

- Landscaping Maintenance: As illustrated in the photographs below and on the next page, the aesthetic plan for this project included extensive landscaping consisting of mulched beds with flowers, shrubs, and trees, as well as a regular mowing plan. Taking care of this landscaping and keeping the interchange looking nice and well-maintained is a continual effort that requires money and professional care. Every two years, ODOT bids out a contract specifically for landscaping maintenance for this interchange (separate from ODOT’s routine structure/roadway maintenance). Mowing, mulching, fertilizing, spraying, and flower/shrub/tree replacement are all handled under this contract.

- Landscaping Challenges: Due to the size of the interchange, an irrigation system was not feasible. Hardy/drought tolerant and low growing species were selected for this project to help keep maintenance costs down and to ensure appropriate traffic sight lines were preserved. A few lessons learned with respect to landscaping and maintenance include drainage, mulch, and topsoil. ODOT noted that since the project was constructed in phases, some landscaping beds were deeper than others, and some had better topsoil than others, which is believed to have contributed to some plant mortality. Additionally, concrete curbs were constructed around the landscaping for aesthetics and to provide good edge lines for mowing/trimming. However, these curbs became somewhat of an issue for drainage. In sloped areas, heavy rain would wash mulch over the concrete curbs. In low/flat areas, the curbs would impede drainage and the beds would become oversaturated. Efforts to remedy the situation included installation of small French drains under the curbs or making small curb cuts. Mulch decay rate has also been an issue. The landscaping plan includes adding new mulch annually to keep a fresh, colorful appearance. However, the mulch is not naturally breaking down as fast as expected, resulting in the occasional need for ODOT to pay for removal of old mulch before new mulch can be put down. Another challenge has been grass growth under the flyover ramps. At locations where the flyover ramps are at lower elevations, grass has died and noticeable dirt spots have developed due to consistent shade and reduced moisture.

- Scuppers: Section 5.1.6 discusses aesthetic challenges with bridge drainage, particularly exposed/unattractive scupper pipes. The long, curved flyover ramps on this project require scupper drainage collection systems that were well-hidden by project designers along the back side of piers and painted the same light-neutral color as the pier. In the top right photograph on the next page, each of these piers has scupper pipe on the back side that is nearly invisible to travelers. However, an unexpected challenge associated with these scuppers is erosion. These scuppers discharge water directly into the interchange infield, and the amount of water and the velocity of water discharged from these pipes has caused erosion and/or hindered grass growth. After several unsuccessful reseeding efforts, rock or gravel was ultimately installed to help address the situation.
Pictographs: As discussed in Section 5.2.1, some of the retaining wall pictographs on this project are quite noticeable and easily viewed at freeway speeds, including the Wright Brothers’ flyer (due to large size and repetition), as well as the fighter jets (due to their contrasting color and repetition). However, some of the space-themed pictographs appear to be undersized, have no contrasting colors, and are not repeated, making it challenging for travelers to notice them at freeway speeds.
Landscaping and Flyover Ramps

Noise Barrier (Top); Space Flight Pictograph on Retaining Wall

MSE Wall with Wright Flyer Pictographs (Beechwood Road)

Consistent Use of Light-Neutral Sealer on Concrete Elements

Grass Problem Under Ramp; Scupper Erosion Area

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6.4 CASE STUDY: I-71 / SR 665 INTERCHANGE

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<th>FRA-71-6.09 (PID 79331)</th>
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<td>Aesthetic Focus:</td>
<td>Gateway Interchange</td>
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Project Description:
The Interstate Route (IR) 71/ State Route (SR) 665 interchange is a southern gateway to Franklin County and an entryway to Grove City. The IR 71/SR 665 interchange modification project involved the conversion of a rural diamond interchange to a Single Point Urban Interchange (SPUI). The SPUI design created a central intersection on the overpass structure, which minimized the overall project footprint while adding capacity. The project corrected geometric design deficiencies that caused significant traffic delays and safety hazards in the project area. The need for the project was based on traffic study data that indicated severe congestion and above average crash rates. Projected residential, industrial, and commercial development in the region intensified the need to correct deficiencies and modify the interchange.

Context and Aesthetic Objectives:
**Context:** The IR 71/SR 665 interchange serves as a gateway to Grove City and to southern Franklin County and is a primary link to the Columbus metropolitan area and the Rickenbacker International Airport. Chapter 4 provides an overview of Gateway Interchanges/Corridors. As is typical for a gateway interchange, Grove City wanted to make a unique visual statement using enhanced aesthetic features in the modified interchange design.

**Aesthetic Objective:** The aesthetic objective was to create a sense of place for Grove City while maintaining cohesion with both baseline treatments and adjacent City branding elements. This was both a branding initiative for Grove City and a chance to create community cohesion by utilizing consistent aesthetic elements that extended beyond the interchange and into the City. Public involvement documentation noted aesthetics as a concern, and some responders stated that aesthetics were an important element of the interchange. A documented goal of this project was to incorporate aesthetic enhancements and beautification components into the design of the interchange. However, no environmental commitments specifically addressed aesthetics.

**Aesthetic Treatments:**
The stone parapet walls and retaining walls used a unique color developed specifically for this project. Decorative vandal fencing with “Grove City” ironwork lettering provides an eye-catching announcement of location. Further enhanced treatments involved black highway sign poles, black decorative light poles and luminaires (a variation of the truss arm and teardrop luminaire design), black bridge railings and traffic signals (including a central traffic signal support truss designed for this specific interchange), and special median treatments. The lighting is consistent with the City’s light poles along SR 665, creating a seamless transition from the IR 71/SR 665 interchange into the City. Landscaping was designed to tie into the pedestrian and bike paths and the landscaping elements extend beyond the interchange to create cohesion with the regional transportation network. Photographs illustrating enhanced treatments are presented on the next page.

Project Challenges, Key Takeaways, and Lessons Learned:
- Challenges/Constraints: A major challenge for the City was to identify funding sources for the enhanced aesthetic treatments, as ODOT did not fund any aesthetic enhancements. The City was able to obtain funding from multiple state and federal sources to help cover these costs, with the remainder of the funding provided by the City.

Continued
An additional challenge was timing the transition of the project from ODOT ownership to local ownership, in relation to the required post-construction maintenance of enhanced treatments (including landscaping and warranties). ODOT and Grove City executed an agreement that specified the City would maintain all landscaping and aesthetic elements above the ODOT baseline treatment, but timing was not considered in advance.

➢ What Worked: ODOT and the City had previously dealt with issues regarding scale and coloration when choosing wall patterns. For this project, the proposed color pattern was tested on a retaining wall facing an adjacent Wendy’s parking lot. This allowed the parties involved to evaluate the proposed pattern in a less visible area, and to ensure that the pattern translated well from concept to physical form. In order to successfully achieve a balance between function and aesthetics, this project used a traffic signal support truss that spans diagonally across the entire intersection, providing four-way signal movements without four mast-arm signal poles. The resulting look is simple and pleasing. The landscaping design was another project accomplishment. Grove City chose to hire an urban forester to implement their vision for landscaping. The urban forester helped the City to select the appropriate species to install for good survival in an urban landscape. The result was a uniform look that extends beyond the interchange and fits with the landscaping themes along the local roadways.

➢ Lessons Learned: Incorporating enhanced aesthetic elements requires forethought in design and budget considerations. While the urban landscaper selected the appropriate species to plant, the planting detail did not consider subgrade and drainage issues, which resulted in high tree mortality. To resolve this issue, underdrains were subsequently installed. It is also important to anticipate how inorganic aesthetic elements will weather or degrade over time. Long-term maintenance of non-baseline aesthetic elements may be costly or impractical and should be a limiting factor in design. At the IR 71/SR 665 interchange, the concrete medians (brick formliner pattern) were sealed with a red tinted sealer. It was later discovered this color fades to pink and weathers unevenly. Regarding work agreements, local and state entities should decide in advance when the transition from ODOT ownership to local ownership occurs, and when the ODOT contractor will be released from responsibility.
Case Study – I-71/SR 665 Interchange

Special Median Treatments

Black Highway Sign Supports

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6.5 CASE STUDY: VROOMAN ROAD BRIDGE

ODOT CRS and PID: LAK-VROOMAN RD (PID #5669/85131)
District: 12
County / Municipality: Lake County, Leroy/Perry Township
Timeline: Construction in Summer 2018
Construction Cost: $27,179,370 (ELLIS)
Stakeholders: ODOT, Lake County, Seneca Nation of Indians, Local Community

Aesthetic Focus: Cultural Resources

Project Description:
The Vrooman Road Bridge Replacement Project involves the replacement of the existing bridge (SFN 4337107) over the Grand River with a new bridge on a new alignment. The selected alternative consists of a high-level bridge north of the existing bridge that connects to Lane Road. The existing bridge has known structural and geometric deficiencies that create safety hazards and frequent bridge closures. The need for the project was established based on the narrow bridge width, poor structural condition, poor approach geometry, and regular closures due to flooding, as well as historic crash rates higher than the statewide average.

Context and Aesthetic Objectives:
Context: The Vrooman Road Bridge serves as connector between Interstate Route 90 and eastern Painesville, Ohio. The bridge crosses the Grand River, a state-designated Wild and Scenic River, and the surrounding area is primarily suburban. There were multiple environmental considerations including high-quality wetlands within an Natural Resource Conservation Service (NRCS) easement, a known endangered mussel species in the project vicinity, the location of the project within the ODNR Coastal Zone and NOAA Great Lakes Coastal Grant easement, two recreational parks, and an archaeological site with human interments. There was also public controversy associated with this project and some opposition by the local community.

Aesthetic Objective: The initial bridge design did not incorporate any aesthetic enhancements above ODOT baseline treatments. However, aesthetic objectives were developed out of later public involvement efforts. The public engaged the Seneca Nation of Indians, who in turn worked with ODOT and the Lake County Engineer’s Office (LCEO) to incorporate treatments relative to their tribe’s history, as the Seneca peoples had historically inhabited the region. Due to the number of environmental resources sustaining impacts from this project, there were a substantial number of Environmental Commitments. None of these environmental commitments, however, specifically addressed aesthetic objectives or enhanced aesthetics for the bridge structure.

Aesthetic Treatments:
The exterior stone parapets and bridge rails will include a unique pattern that was developed through coordination with the Seneca Nation of Indians. The pattern is an in-filled chevron motif based on pottery rim sherds from various regional archaeological sites. Additionally, decorative renderings placed on the bridge piers will depict a torch fisher, an ice fisher, lacrosse player, and similar motifs significant to historic tribal life, that were developed through tribal consultation. An educational kiosk will be placed in an adjacent park to help inform the public about the native people who inhabited this area prior to European settlement and to explain the meaning behind the aesthetic designs. Graphic renderings illustrating enhanced treatments are presented on the next page.

Project Challenges, Key Takeaways, and Lessons Learned:
➢ Challenges/Constraints: There were budget concerns from the County regarding the enhanced aesthetic bridge elements. These enhanced elements were added late in the project development process and were not covered in the original project budget. The LCEO wanted to be budget-conscious and control costs by using the standard county colors and design. Aesthetic enhancements typically come at a higher cost for both construction and maintenance. The selected enhanced treatments sought to strike a balance between budget and aesthetics.
> **What Worked:** Originally, there was significant public concern regarding this project, in particular from local residents with concerns about traffic, safety, property values, noise, and the disturbance of parks and archaeological remains. As a result, ODOT initiated further consultation with the Seneca Nation of Indians to mitigate potential impacts to the known archaeological site adjacent to the project area. This positive coordination effort, in concert with the improved aesthetics for the bridge, allayed much of the public concern and boosted public buy-in for the project.

> **Lessons Learned:** Aesthetics should have been considered early in the project planning process. The attractive and meaningful enhanced design elements could have been utilized as a positive tool for public involvement and could have minimized public controversy over this project. Incorporating an aesthetic design process into the planning phase of the project should be an essential part of ODOT’s Project Development Process.

---

**Enhanced Bridge Pier Designs (B. Anderson, Seneca Nation of Indians)**

**Enhanced Bridge Rail Designs**

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6.6 CASE STUDY: SOCIALVILLE-FOSTER ROAD (PHASE 1)

<table>
<thead>
<tr>
<th>ODOT CRS and PID:</th>
<th>None - 100% Local (Warren County TID)</th>
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<tbody>
<tr>
<td>ODOT District:</td>
<td>8</td>
</tr>
<tr>
<td>County / Municipality:</td>
<td>Warren County, City of Mason</td>
</tr>
<tr>
<td>Timeline:</td>
<td>2011-2017</td>
</tr>
<tr>
<td>Construction Cost:</td>
<td>$5,900,000 (Phase I)</td>
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<tr>
<td>Key Stakeholders:</td>
<td>Warren County TID, Deerfield Township, City of Mason, ODOT</td>
</tr>
<tr>
<td>Aesthetic Focus:</td>
<td>Baseline Aesthetic Treatments (Bridge and Roundabout)</td>
</tr>
</tbody>
</table>

Project Description:
Socialville-Foster Road (also known as County Road 32) is located in Deerfield Township and the City of Mason in southern Warren County (near Kings Island). Socialville-Foster Road is approximately 5.5 miles in length and classified by ODOT as an Urban Local Road. The roadway varies from a two-lane facility east of I-71 to a four and five-lane facility west of I-71. In the vicinity of I-71, this roadway carries approximately 10,000 vehicles per day, which is expected to increase due to residential and commercial development in the City of Mason and Deerfield Township. Due to this development, the Warren County Transportation Improvement District (WCTID), in coordination with Deerfield Township, the City of Mason, and ODOT, widened 0.35 miles of Socialville-Foster Road from two lanes to five lanes from Columbia Road west across I-71 to Innovation Way. The project included reconstruction of the bridge over I-71 and a roundabout at Innovation Way.

Context and Aesthetic Objectives:
**Context:** Due to the pace of residential and commercial development in the City of Mason and Deerfield Township, the Socialville-Foster Road Widening is one of a number of recent, current, or planned roadway projects in this area, including major improvements at the Western Row Road/I-71 Interchange (WCTID/ODOT) and the Field-Ertel Road/I-71 interchange (Warren County/ODOT), a relocation and widening of Columbia Road (WCTID/ODOT), a widening and extension of Innovation Way (WCTID), improvements along Kings Island Drive (City of Mason), and a widening of Mason-Montgomery Road (City of Mason). The Socialville-Foster Road Widening had been on Warren County’s radar since the late 1990’s. When local funds became available in 2011, Warren County quickly advanced the project to design. However, since construction of the project would require the reconstruction and widening of an ODOT bridge over I-71, and the bridge was not in need of any repairs or improvements from ODOT’s standpoint, Warren County funded all I-71 bridge work with 100% local money. Furthermore, since the I-71 bridge is an ODOT structure, Warren County utilized ODOT design standards and obtained an ODOT permit to widen the bridge.

**Aesthetic Objectives:** Warren County’s goal for the project was to create an economical, functional, and visually appealing design that addressed the area’s traffic needs and met ODOT’s design/permit requirements. From an aesthetic standpoint, the project included many of ODOT’s baseline treatments outlined in Chapter 5 of this guidance document. Further discussion of the project’s baseline aesthetic treatments are summarized below and are illustrated in the photographs on the next page. Note: Not every treatment in this project fully matches ODOT’s baseline per Chapter 5, since it was funded locally. The purpose of this case study is to highlight the numerous treatments that do match ODOT’s baseline and illustrate how these treatments collectively function on a well-designed and well-constructed project to establish a unified and visually appealing appearance.

**Aesthetic Treatments:** The following baseline aesthetic treatments were included in the design of this project: 1) weathering steel bridge girders; 2) stub abutments with MSE walls coated with a light-neutral epoxy-urethane sealer; 3) an ashlar block formliner pattern on the MSE wall panels; 4) pier caps and pier columns coated with a light-neutral epoxy-urethane sealer; 5) concrete sidewalk (curbed or with grass buffer); 6) galvanized twin-tube pedestrian railing on concrete parapet (parapet, deck fascia, and sidewalk on bridge all coated with light-neutral epoxy-urethane sealer); 7) galvanized vandal protection fencing; 8) standard galvanized guardrail (MGS); 9) painted (striped) center median; 9) 6” raised concrete splitter islands and truck apron at roundabout; 10) black monoarm street lighting with LED luminaires; 11) painted (striped) crosswalks; and 12) earthen central island (in roundabout) with brown hardwood mulch and small shrub and tree plantings.

Continued
Project Challenges, Key Takeaways, and Lessons Learned:

- **Roundabout Elevation**: One challenging issue on this project was design of the central island in the roundabout. Due to the vertical grade difference between the bridge and the roundabout, it was not possible to construct the central island to fully break line-of-sight through the island. Improvement is anticipated as landscape plantings mature. A related takeaway for designers is to make sure that adequate earthen fill/topsoil is specified in the plans to construct the earthen mound to the appropriate elevation and to support plant growth.

- **Irrigation**: As discussed in Chapter 5, proper irrigation is critical for landscaping. For this project, the roundabout design included drought-tolerant plantings and the basic infrastructure for an irrigation system (main water supply line). Due to this, if irrigation is determined to be needed in the future, the system can be completed without damaging pavement or disrupting traffic.

- **Landscaping Maintenance**: Another challenge for sponsors of roadway projects that include landscaping/plantings is post-construction maintenance. The WCTID/Engineer’s Office, for example, does not employ a staff for landscaping maintenance. Therefore, for this project, Warren County has arranged for Deerfield Township to maintain the roundabout landscaping.

- **Utilities**: This project required removal of a large utility line from the I-71 bridge prior to reconstruction. A challenging aspect of this task involved coordinating with ODOT for a night-time closure of the interstate highway to remove the utility line from the bridge and then coordinating with a local utility provider to relocate the line to adjacent utility poles (see Chapter 5.2.12 for additional discussion of utilities). This project also involved relocation of several utility poles. Since these utility poles existed in Warren County right-of-way, the utility provider funded the pole relocations. As part of the pole relocation work, the utility provider chose to replace the existing wood poles with new galvanized steel poles.

- **Construction Management**: The Socialville-Foster Road bridge over I-71 is an ODOT structure, and Warren County needed an ODOT permit to widen the bridge. However, since the bridge would remain in ODOT jurisdiction and would be fully maintained by ODOT after construction, Warren County coordinated all aspects of the bridge design with ODOT and hired an ODOT-qualified construction management consultant to ensure that all aspects of the bridge were constructed per plan. This gave Warren County (and ODOT) the confidence that the bridge ODOT would be maintaining for the long-term met ODOT’s engineering and construction specifications.
Case Study – Socialville-Foster Road (Phase 1)

Facing North on Innovation Way

Sidewalk, Grass Buffer and Monoarm Street Light

Roundabout and Concrete Splitter Island at Innovation Way

Concrete Truck Apron and Central Island Plantings

New Galvanized Joint-Use Utility Pole

Ashlar Block Pattern on MSE Wall Panels

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REFERENCES
REFERENCES

The following documents were reviewed for information regarding aesthetic fundamentals, enhancement considerations, and examples of best practices (see Appendix C for a Supplemental Reference Library for aesthetic treatments). Note that the aesthetic design concepts and images in these reference documents may not be fully consistent with ODOT design and/or construction specifications. Hyperlinks to ODOT environmental, design, and construction guidance documents and manuals are included within Chapters 1 through 5 of this document.


APPENDIX A

FORMS AND CHECKLISTS
**AESTHETIC STRATEGY CHECKLIST**
(to be completed by the ODOT PM* or Design Team)

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>ODOT PM:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODOT CRS and PID:</td>
<td>Consultant PM:</td>
</tr>
<tr>
<td>District:</td>
<td>Local Agency PM:</td>
</tr>
<tr>
<td>County / Municipality:</td>
<td></td>
</tr>
<tr>
<td>Project Description:</td>
<td></td>
</tr>
<tr>
<td>Anticipated PDP Path:</td>
<td>Anticipated CE Level:</td>
</tr>
</tbody>
</table>

* Or other assigned staff.

**Section A. Exempt Projects**

<table>
<thead>
<tr>
<th>☐</th>
<th>Projects that do not directly lead to construction activities, such as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>Planning and technical studies</td>
</tr>
<tr>
<td>☐</td>
<td>Technical and operating assistance</td>
</tr>
<tr>
<td>☐</td>
<td>Designating highways as bike routes</td>
</tr>
<tr>
<td>☐</td>
<td>Purchase of vehicles and equipment</td>
</tr>
<tr>
<td>☐</td>
<td>Disposal of excess right-of-way or joint/limited use of right-of-way</td>
</tr>
<tr>
<td>☐</td>
<td>Changes in access control</td>
</tr>
<tr>
<td>☐</td>
<td>Acquisition of land for hardship/protective purposes</td>
</tr>
<tr>
<td>☐</td>
<td>Land donations, land transfers, easement acquisitions</td>
</tr>
<tr>
<td>☐</td>
<td>Emergency repairs under a declaration by the Governor</td>
</tr>
<tr>
<td>☐</td>
<td>Minor maintenance/improvements to existing ODOT facilities</td>
</tr>
<tr>
<td>☐</td>
<td>Installing or replacing electronic, communication, or information processing devices (excluding signals/signs)</td>
</tr>
<tr>
<td>☐</td>
<td>Maintenance or improvements to rail crossings or warning signals within ODOT right-of-way</td>
</tr>
<tr>
<td>☐</td>
<td>Closure/relocation of at-grade rail crossings</td>
</tr>
<tr>
<td>☐</td>
<td>Pavement resurfacing (mill-and-fill)</td>
</tr>
<tr>
<td>☐</td>
<td>Pavement marking/striping; painting shoulders for bike lanes</td>
</tr>
<tr>
<td>☐</td>
<td>Guardrail repair/replacement</td>
</tr>
<tr>
<td>☐</td>
<td>Culvert lining/culvert maintenance, minor culvert replacement</td>
</tr>
<tr>
<td>☐</td>
<td>Clear zone spraying, mowing, brush removal/trimming</td>
</tr>
<tr>
<td>☐</td>
<td>Ditch/drainage structure clean-outs</td>
</tr>
<tr>
<td>☐</td>
<td>Minor bridge repair/rehab projects (see Chapter 3, Section 3.1.2. for further information)</td>
</tr>
<tr>
<td>☐</td>
<td>Pavement joint repair; pavement resurfacing (mill-and-fill)</td>
</tr>
<tr>
<td>☐</td>
<td>Sign and fence repair</td>
</tr>
<tr>
<td>☐</td>
<td>Lighting repair</td>
</tr>
<tr>
<td>☐</td>
<td>Retaining wall and noise barrier repair</td>
</tr>
<tr>
<td>☐</td>
<td>Other applicable project type:</td>
</tr>
</tbody>
</table>

If "Yes", check all that apply and STOP. No additional consideration of aesthetic treatments is necessary. Sign and date below, notify the District Environmental Coordinator (DEC), and include the checklist in ODOT's Project File (EnviroNet).

If "No" is selected above, write “Not Applicable” in the signature line below and proceed to Section B.

☐ ODOT PM Signature*:  
(* or other assigned staff)
### Section B. Baseline vs. Enhanced Treatment Considerations

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the project a Path 3, Path 4, or Path 5 project?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is the project located within/adjacent to a community/municipality?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is the project sponsored by a local agency? If &quot;Yes&quot; Agency Name:</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Will the project require stakeholder/public involvement meetings?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is the project located within/adjacent to sensitive environmental areas?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

If “No” is selected for all the above, STOP. Baseline treatments are appropriate for this project. No additional consideration of enhanced aesthetic treatments is likely to be necessary. Sign and date below, notify the DEC, and include the checklist in ODOT’s Project File (EnviroNet). Review during the Preliminary Engineering Phase.

If “Yes” is selected for any of the above, proceed to Section C.

* Including but not limited to historic properties, parks/recreational areas, scenic rivers, traditionally underserved populations.

### Section C. Enhanced Treatment Considerations

#### Project Information

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the project an initial phase of a larger project?</td>
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<td>☐</td>
</tr>
<tr>
<td>Does the project involve a community “gateway”, urban highway corridor, or streetscape?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If “Yes”, briefly describe:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the design aspects of the facility easily visible to the traveler?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is the facility visible from adjacent properties?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Adjacent Land Uses?</td>
<td>☐ Commercial ☐ Residential ☐ Agricultural ☐ Forested ☐ Other:</td>
<td></td>
</tr>
<tr>
<td>Additional Information:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Environmental Commitment Considerations

List known Sensitive Environmental Resource(s) in the project area (see PIP):

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>Will the project likely require environmental commitments involving aesthetics?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>What type(s) of commitments are anticipated?</td>
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<td></td>
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</tbody>
</table>

#### Community/Stakeholder Information

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Name(s):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder Info (Name/Phone/Email):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has contact been made with stakeholder(s)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Has aesthetics been discussed with stakeholder(s)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Has funding/maintenance of aesthetic treatments been discussed with stakeholder(s)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is there an existing (or desired) aesthetic theme or corridor vision known at this time?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If “Yes”, briefly describe:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any planned developments in the project area?</td>
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<td>☐</td>
</tr>
<tr>
<td>Are there local standards/alternate baseline treatments that may apply to the project?</td>
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<tr>
<td>If “Yes”, briefly describe:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has a public involvement plan been prepared?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are community design workshops likely required?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

#### Potential Enhanced Aesthetic Treatments

List potential enhanced aesthetic treatment options that may be appropriate for this project.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the Project Team include a qualified specialist for aesthetic enhancements?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>List aesthetic specialists on the Project Team (or may need to be added):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sign and date below, notify the DEC, and include the checklist in ODOT’s Project File (EnviroNet). Review during the Preliminary Engineering Phase.

ODOT PM Signature*: (* or other assigned staff) Date:
AESTHETIC FUNDING ASSESSMENT FORM
(to be completed by the Design Team)

<table>
<thead>
<tr>
<th>☐ Preliminary Engineering (PE) Phase</th>
<th>☐ Environmental Engineering (EE) Phase</th>
<th>☐ Final Engineering (FE) Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>ODOT PM:</td>
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<tr>
<td>ODOT CRS and PID:</td>
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<td>District:</td>
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<tr>
<td>County / Municipality:</td>
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<tr>
<td>Project Description:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipated PDP Path:</td>
<td>Anticipated CE Level:</td>
<td></td>
</tr>
</tbody>
</table>

Is the project exempt from the aesthetic design process? (see Aesthetic Strategy Checklist)  ☐ Yes  ☐ No

If “Yes”, STOP. Completion of this form is not required. If “No”, proceed to next section.

Does the project only include baseline aesthetic treatments?  ☐ Yes  ☐ No

If “Yes”, STOP. Sign and date below and include this form and the Aesthetic Design Checklist with the design plan review submittal. If “No”, proceed to next section.

What is the basis for including enhanced aesthetic treatments?  ☐ Local Agency Sponsored Project
☐ Stakeholder/Public Involvement  ☐ Environmental Commitments  ☐ Other___________________

If only “Environmental Commitments” is checked above, STOP. Sign and date below and include this form and the Aesthetic Design Checklist with the design plan review submittal. Otherwise, proceed to next section.

| A. Estimated total project construction cost:                        |
| B. Estimated cost of all proposed aesthetic enhancements:           |
| C. Estimated cost of aesthetic enhancements for ODOT environmental commitments: |
| D. Estimated cost of stakeholder/local agency aesthetic enhancements (Line B - Line C): |
| E. Is a qualified aesthetic consultant/specialist included on the Project Team?  ☐ Yes  ☐ No |
| F. If “Yes”, what is the estimated cost?                           |
| G. Estimated stakeholder/local agency aesthetic enhancement costs (Line D + Line F): |
| H. Percentage of total project construction cost (Line G divided by Line A):  % |

Describe any long-term maintenance or life-cycle costs (optional):

| I. Stakeholder/local agency funding commitment for aesthetic enhancements (0 to 100%):  % |
| J. If Line I is less than 100%, will ODOT commit to funding remaining amount?  ☐ Yes  ☐ No |
| K. If “No”, will the stakeholder/local agency commit to funding remaining amount?  ☐ Yes  ☐ No |
| L. If Alternate Bid Price exceeds estimate, will ODOT fund remaining amount?  ☐ Yes  ☐ No |
| M. If Alternate Bid Price exceeds estimate, will stakeholder/local agency fund remaining amount?  ☐ Yes  ☐ No |

N. If Lines J, K, L, and M are “No”, list ODOT recommendations:

Has a Participation Agreement been drafted/executed?  ☐ Yes  ☐ No

Sign and date below and include this form, the Aesthetic Design Checklist, and any Participation Agreements with the design plan review submittal.

<table>
<thead>
<tr>
<th>Stage 1 (PE Phase)</th>
<th>Stage 2 (EE Phase)</th>
<th>Stage 3 (FE Phase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Team</td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>ODOT PM:</td>
<td></td>
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</tr>
<tr>
<td>Aesthetics Committee Representative:</td>
<td></td>
<td></td>
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Aesthetic Funding Assessment Form
AESTHETIC DESIGN CHECKLIST
(to be completed by Design Team)

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>ODOT CRS and PID:</th>
<th>ODOT PM:</th>
<th>Consultant PM:</th>
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<tr>
<td>District:</td>
<td>Local Agency PM:</td>
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<td>County / Municipality:</td>
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<tr>
<td>Project Description:</td>
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<tr>
<td>Anticipated PDP Path:</td>
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</tr>
<tr>
<td>Anticipated CE Level:</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Is the project exempt from the aesthetic design process? (see Aesthetic Strategy Checklist)  □ Yes □ No

If “Yes”, STOP. Completion of this form is not required. If “No”, proceed to next section.

What types of aesthetic treatments are included in the plans? Check both boxes if applicable.

□ Baseline □ Enhanced

Summarize how was this determined (include meeting dates and reference applicable agency correspondence):

Is there a specific aesthetic theme or corridor vision that is being followed?  □ Yes □ No

If “Yes”, summarize what it is and how it was determined:

* NOTE: The next sections summarize proposed aesthetic treatments for the project. In some cases (particularly Stage 1 plans), a proposed aesthetic treatment may not be shown in the current plan set but will be included in a future set.

### Bridge Treatments

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
<th>Alternate Baseline?</th>
<th>Alternate Bid Item?</th>
<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vandal Fencing</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Pedestrian Railing</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Parapets</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Deck Fascia</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Beams/Girders</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Abutments</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Pier Caps</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td></td>
</tr>
<tr>
<td>Pier Columns</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
<td>□ Yes</td>
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<tr>
<td>Drainage/Scuppers</td>
<td>□ Baseline □ Enhanced □ N/A</td>
<td>□ Yes</td>
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<tr>
<td>Utilities</td>
<td>□ Baseline □ Enhanced □ N/A</td>
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<tr>
<td>Other:</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:
**Lighting Treatments**

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
<th>Alternate Baseline?</th>
<th>Alternate Bid Item?</th>
<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
</tr>
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<tbody>
<tr>
<td>Highway Lighting</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
<td>☐ Yes ☐ Yes</td>
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<tr>
<td>Interchange Lighting</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
<td>☐ Yes ☐ Yes</td>
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<tr>
<td>Street Lighting</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
<td>☐ Yes ☐ Yes</td>
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<tr>
<td>Bridge Lighting</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
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<tr>
<td>Other:</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
<td>☐ Yes ☐ Yes</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

**Traffic Signal Treatments**

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
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<th>Alternate Bid Item?</th>
<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
</tr>
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<tbody>
<tr>
<td>Poles/Mast Arms</td>
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<tr>
<td>Signal Heads</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
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<tr>
<td>Other:</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A</td>
<td>☐ Yes ☐ Yes</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

**Retaining Wall, Noise Wall, and Longitudinal Barrier Treatments**

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
<th>Alternate Baseline?</th>
<th>Alternate Bid Item?</th>
<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
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<tbody>
<tr>
<td>Retaining Walls</td>
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<tr>
<td>Concrete Shoulder Barrier</td>
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<tr>
<td>Concrete Median Barrier</td>
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<td>Guardrail</td>
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<tr>
<td>Noise Wall Panels</td>
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<tr>
<td>Noise Wall Panel Caps</td>
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<tr>
<td>Noise Wall Posts</td>
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<td>Other:</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

**Landscaping Treatments**

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<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
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<tbody>
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<td>Woody Plantings</td>
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<td>Seed Mixes</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

**Signage Treatments**

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<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
<th>Alternate Baseline?</th>
<th>Alternate Bid Item?</th>
<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
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<tbody>
<tr>
<td>Highway Signage</td>
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<td>Community Signage</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:
Roadway/Sidewalk Treatments

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<th>Aesthetic Element</th>
<th>Proposed Treatment</th>
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<th>List Plan Sheets (Alternative Baseline or Enhancements)</th>
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<tr>
<td>Buffers (Tree Lawns)</td>
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</tr>
<tr>
<td>Utilities</td>
<td>☐ Baseline ☐ Enhanced ☐ N/A ☐ Yes ☐ Yes</td>
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<td></td>
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<tr>
<td>Crosswalks</td>
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<td>Medians</td>
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<td>Islands</td>
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List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

**Special Treatments**

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<tr>
<th>Aesthetic Element</th>
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<th>Alternate Bid Item?</th>
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<td>Benches/Tables</td>
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<td>Trash Receptacles</td>
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<td>Rest Rooms/Shelters</td>
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<tr>
<td>Kiosks/Monuments</td>
<td>☐ Enhanced ☐ N/A</td>
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<td>Interpretive Signage</td>
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<td>Decorative Wall</td>
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<tr>
<td>Logos/Lettering</td>
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</tr>
</tbody>
</table>

List Specific Proposed Alternative Baseline Treatments:
List Specific Proposed Enhanced Treatments:
List Specific Proposed Alternate Bid Items:

* All special treatments are considered “enhancements”.

**General**

☐ Construction drawings are to scale and large enough to adequately depict aesthetic treatments.

☐ Drawings adequately show or describe surface treatments (texture and color), transitions/connections between various elements with details that indicate textural patterns and relief depths.

☐ The plans have been reviewed for potential proprietary restrictions (if federal funds are being used).

☐ The plans have been reviewed for potential bid issues (such as local specs that conflict with ODOT specs, and poorly-defined or conflicting standards of acceptance).

*Describe any potential issues here:*

☐ Funding guidelines/alternate bid considerations for aesthetic enhancements have been discussed with stakeholders.

☐ Maintenance requirements for enhanced aesthetic treatments have been discussed with stakeholders.

☐ Potential long-term maintenance issues and life-cycle costs have been discussed with stakeholders.

*Describe any potential issues here:*

☐ Participation Agreement(s) completed/included.

☐ Aesthetic Funding Assessment Form completed/included.

*List any agreements or outstanding issues that still need to be secured/resolved:*

Sign and date below and include this form, the Aesthetic Funding Assessment Form, and any Participation Agreements with the design plan review submittal.

<table>
<thead>
<tr>
<th></th>
<th>Stage 1 (PE Phase)</th>
<th>Stage 2 (EE Phase)</th>
<th>Stage 3 (FE Phase)</th>
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<tr>
<td><strong>Design Team</strong></td>
<td>Signature</td>
<td>Date</td>
<td>Signature</td>
</tr>
<tr>
<td>Consultant PM:</td>
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</tr>
<tr>
<td>ODOT PM:</td>
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</table>
APPENDIX B

BASELINE TREATMENTS SUMMARY
## Appendix B1 - Baseline Aesthetic Treatments Summary

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>ODOT Baseline Treatment</th>
<th>ODOT Design Manual Reference</th>
<th>Example Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concrete Parapets</strong>&lt;br&gt;(see Section 5.1.1)</td>
<td>For interchange bridges (statewide) and non-interchange bridges in urban areas: 42” single-slope concrete parapet with: 1) two 1.5” x 0.75” equally spaced horizontal grooves, or 2) dry stack, fractured fin, or ashlar block formliner pattern, and 3) light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778).&lt;br&gt;For non-interchange bridges in rural areas: 42” single-slope concrete parapet with two 1.5” x 0.75” equally spaced horizontal grooves and light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778).&lt;br&gt;See Appendix B2 for close-up photographs of formliner pattern details.</td>
<td>Bridge Design Manual (BDM) 209.2 and 304</td>
<td><img src="example_photos1.png" alt="Example Photos" /></td>
</tr>
<tr>
<td><strong>Bridge Railing</strong>&lt;br&gt;(see Section 5.1.1)</td>
<td>Galvanized twin-tube steel railing mounted on the side of the bridge deck (32” minimum height above the deck). Railing, posts, and hardware are unpainted (galvanized steel) or are painted black. Note: This railing is not to be used where pedestrian/bike traffic is expected per BDM 304.3.3. Deep Beam Guardrail (DBR-2-73) is also an option for low volume, narrow bridges (see BDM 304.3.2).</td>
<td>BDM 209.2 and 304</td>
<td><img src="example_photos2.png" alt="Example Photos" /></td>
</tr>
<tr>
<td><strong>Pedestrian Railing with Concrete Parapet</strong>&lt;br&gt;18” high galvanized twin-tube steel railing mounted on a 24” concrete parapet. The parapet is sealed with a light neutral epoxy-urethane or non-epoxy tinted sealer (Federal Color 17778). For interchange bridges (statewide) requiring pedestrian railing, the railing, posts, and hardware are painted black. For all other bridges requiring pedestrian railing (rural or urban), the railing, posts, and hardware are unpainted (galvanized steel) or are painted black.</td>
<td>BDM 209.2 and 304</td>
<td><img src="example_photos3.png" alt="Example Photos" /></td>
<td></td>
</tr>
<tr>
<td>Aesthetic Element</td>
<td>ODOT Baseline Treatment</td>
<td>ODOT Design Manual Reference</td>
<td>Example Photos</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------</td>
<td>-------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Vandal Fencing (see Section 5.1.2)</td>
<td>Galvanized chain-link wire fabric with 1” diamonds and PVC coating. For interchange bridges (statewide) where vandal protection fencing is required, the PVC coating is black and the posts, railing, and hardware are painted black. For all other bridges (statewide) where vandal protection fencing is required, the PVC coating is gray and the posts, railing, and hardware are unpainted (galvanized steel) or the PVC coating is black and the posts, railing, and hardware are painted black.</td>
<td>BDM 305</td>
<td><img src="image1.jpg" alt="Example Photos" /> <img src="image2.jpg" alt="Example Photos" /></td>
</tr>
<tr>
<td>Deck Fascia</td>
<td>Provide deck slab overhang per BDM 205.6. Seal the concrete deck fascia with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778). Seal underneath the overhang from the deck fascia to the fascia beam. The vertical sides and 6” on the underside of concrete slab bridges are also sealed.</td>
<td>BDM 205 and 302</td>
<td><img src="image3.jpg" alt="Example Photos" /> <img src="image4.jpg" alt="Example Photos" /></td>
</tr>
<tr>
<td>Beams/Girders</td>
<td>For new bridges or superstructure rebuilds, use coated steel beams/girders and paint per CMS 708. Color selection made by the ODOT Project Manager (FS-595C-10324 - light brown; FS-595C-14277 - light green; FS-595C-15526 - light blue) For bridges in sensitive areas (such as parks) or where maintenance may be difficult (railroad bridges, bridges over water, tall bridges), use uncoated weathering steel beams/girders. Paint the last 10 feet of each beam/girder and above each pier a matching dark brown color (Federal Color 20059) to prevent staining. Metallized or galvanized steel beams/girders are also options in these situations. If prestressed concrete box beams or prestressed concrete I-beams are determined by the design team to be more economical than steel on a specific project, seal the fascia beams with a light brown, light green, or light blue epoxy-urethane or tinted non-epoxy sealer (the same federal colors as listed above for steel). For superstructure rehabilitation projects involving previously-painted steel or previously-sealed prestressed concrete beams/girders, repaint or reseal to match the existing color scheme (or use federal colors per CMS 708).</td>
<td>Construction and Material Specifications (CMS) 512 and 708.</td>
<td><img src="image5.jpg" alt="Example Photos" /> <img src="image6.jpg" alt="Example Photos" /></td>
</tr>
<tr>
<td>Aesthetic Element</td>
<td>ODOT Baseline Treatment</td>
<td>ODOT Design Manual Reference</td>
<td>Example Photos</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------</td>
<td>-------------------------------</td>
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</tr>
<tr>
<td><strong>Bridge Piers</strong> (see Section 5.1.4)</td>
<td><strong>Highway Overpass Bridges</strong>&lt;br&gt;Cap-and-column pier style using 36” diameter (minimum) round concrete pier columns and cantilevered concrete pier caps with rounded ends. The bottom of the cantilevered end is beveled (sloped upward). The width of pier cap is 4” greater than the diameter of the pier columns (minimum). Seal caps and columns with a light-neutral epoxy-urethane or tinted non-epoxy tinted sealer (Federal Color 17778). Pier sealing should be performed in accordance with BDM 303.1 and ODOT District scoping recommendations. In general, piers should be sealed if exposed to salt/deicing spray or are highly visible to traffic/pedestrians.</td>
<td>BDM 204.5 and 303.3</td>
<td>![Example Photos]</td>
</tr>
<tr>
<td><strong>Waterway Bridges</strong></td>
<td>Capped pile (concrete or encased steel piles), cap-and-column, T-type, or solid wall concrete piers per BDM 204.5 and BDM 303.3. Concrete elements are sealed with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778). Note: polyethylene pile encasements are needed for low pH waters. Pier sealing should be performed in accordance with BDM 303.1 and ODOT District scoping recommendations. In general, piers should be sealed if exposed to salt/deicing spray or are highly visible to traffic/pedestrians.</td>
<td>BDM 204.5 and 303.3</td>
<td>![Example Photos]</td>
</tr>
<tr>
<td><strong>Bridge Abutments</strong> (see Section 5.1.5)</td>
<td><strong>Stub Abutments (or Partial-Height Wall Abutments) with Spill-Through Slopes</strong>&lt;br&gt;Seal concrete surfaces with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778). Do not apply formliners. Protect the surface of the spill-through embankment slope per BDM 209.4.</td>
<td>BDM 204, 205, 209 and 303</td>
<td>![Example Photos]</td>
</tr>
<tr>
<td><strong>Stub Abutments on MSE Wall</strong></td>
<td>Apply an ashlar block, dry stack, or fractured fin (vertical groove) formliner pattern to the MSE wall panels. Seal all concrete surfaces with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778). See Appendix B2 for close-up photographs of formliner pattern details.</td>
<td>BDM 204, 205, 209 and 303</td>
<td>![Example Photos]</td>
</tr>
</tbody>
</table>
## Baseline Aesthetic Treatments Summary

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>ODOT Baseline Treatment</th>
<th>ODOT Design Manual Reference</th>
<th>Example Photos</th>
</tr>
</thead>
</table>
| **Bridge Abutments** (see Section 5.1.5) (Continued) | **Full-Height Wall Abutments**  
Apply an ashlar block, dry stack, or fractured fin (vertical groove) formliner pattern to concrete abutment walls and wing walls. Seal all concrete surfaces with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778).  
*See Appendix B2 for close-up photographs of formliner pattern details.* | BDM 204, 205 and 303                                               | ![Image](Image1) |
| **Bridge Drainage/Scuppers** (see Section 5.1.6) | **Vertical Pipe Scuppers**  
Locate inside the fascia beam. The bottom of the vertical pipe should extend a minimum of 8" below the bottom of the fascia beam. Paint the vertical pipe to match the color of the fascia beam. | BDM 209.3                                                           | ![Image](Image2) |
| **Scuppers/Drainage Pipe Collection Systems** | Locate inside the fascia beam. Vertical pipes within these collection systems should be attached to the inside of pier columns, away from the view of approaching traffic whenever possible. | BDM 209.3                                                           | ![Image](Image3) |
| **Bridge Lighting** (see Section 5.1.7) | **There is no baseline for decorative bridge lighting. See Section 5.2.8 for highway/street lighting on bridges.** | Traffic Engineering Manual (TEM) Part 11                             | N/A            |
| **Retaining Walls** (see Section 5.2.1) | **Apply an ashlar block, dry stack, or fractured fin (vertical groove) formliner pattern to cast-in-place retaining walls, MSE walls, or other concrete retaining walls. Seal with a light-neutral epoxy-urethane or tinted non-epoxy sealer (Federal Color 17778).  
*See Appendix B2 for close-up photographs of formliner pattern details.*** | BDM 204.6 and 303.5  
Location and Design Manual (L&D), Volume 3, 1404.2  
Supplemental Specification 840 | ![Image](Image4) |
<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>ODOT Baseline Treatment</th>
<th>ODOT Design Manual Reference</th>
<th>Example Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal Barriers (see Section 5.2.2)</td>
<td><strong>Flexible</strong>&lt;br&gt;High-tensioned, galvanized steel cable and anchor post systems (proprietary) per L&amp;D 603.1.1.2.</td>
<td>L&amp;D Volume 1, 602 and 603</td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><strong>Semi-Rigid</strong>&lt;br&gt;Galvanized steel “w-beam” rails (unpainted), wood or steel posts, and wood or composite blockouts (Midwest Guardrail System) per L&amp;D 603.1.2 and Standard Construction Drawings (SCD’s) - MGS Series.</td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><strong>Rigid</strong>&lt;br&gt;42” or 57” single-slope concrete barrier, sealed with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778) per L&amp;D 603.1.4 and SCD RM-4.3, RM-4.5, and RM-4.6.</td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td>Noise Barriers (see Section 5.2.3)</td>
<td><strong>Baseline Texture Options</strong>&lt;br&gt;Concrete with an ashlar block formliner pattern is ODOT’s standard preference (per BDM 802). Other texture options available for public/stakeholder selection:&lt;br&gt;- concrete with dry stack pattern&lt;br&gt;- concrete with fieldstone pattern&lt;br&gt;- fiberglass with horizontal groove pattern&lt;br&gt;- vegetative screening</td>
<td>BDM 800 Highway Traffic Noise Manual</td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><strong>Baseline Color Options</strong>&lt;br&gt;Color options available for public/stakeholder selection: beige, light gray, and tan. ODOT’s current preference is not to apply colored sealers to concrete noise barrier posts along roadway shoulders.</td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><strong>Noise Barriers on Bridges</strong>&lt;br&gt;Fiberglass (or other lightweight) noise barrier panels (beige, light gray, or tan) with steel posts.</td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><em>See Appendix B2 for close-up photographs of formliner pattern details.</em></td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td>Posts, caps, and steps/transitions and other design specs per BDM 800 and NBS 1-09 and Highway Noise Traffic Manual.</td>
<td></td>
<td>![Example Photo]</td>
</tr>
<tr>
<td></td>
<td><em>In some circumstances, clear acrylic panels may be considered as a baseline treatment (bridge-mounted or ground-mounted) if there are adjacent sensitive land uses.</em></td>
<td></td>
<td>![Example Photo]</td>
</tr>
</tbody>
</table>
## Baseline Aesthetic Treatments Summary

<table>
<thead>
<tr>
<th>Aesthetic Element</th>
<th>ODOT Baseline Treatment</th>
<th>ODOT Design Manual Reference</th>
<th>Example Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROW Fence</strong> (see Section 5.2.4)</td>
<td><strong>Type CLT</strong>: Chain link fence with 60” fabric with a tension wire on top.</td>
<td>L&amp;D Volume I, 606</td>
<td><img src="image1.jpg" alt="Type CLT" /> <img src="image2.jpg" alt="Type 47" /></td>
</tr>
<tr>
<td></td>
<td><strong>Type 47</strong>: Woven wire fence with a 47” fabric, steel line posts, and one strand of barbed wire on top.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Type 47RA</strong>: Woven wire fence with a 47” fabric, wood line posts, and no barbed wire on top.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Highway Guide Signs</strong> (see Section 5.2.5)</td>
<td>Baseline treatment details for highway guide signs are detailed in OMUTCD Chapter 2E and TEM Chapter 209. Sign supports are unpainted and galvanized steel and aluminum. Designers should follow the sign spreading concepts described in OMUTCD Section 2E.11.</td>
<td>TEM Part 2 Sign Designs and Markings Manual (SDMM)</td>
<td><img src="image3.jpg" alt="TEM Part 2" /> <img src="image4.jpg" alt="Highway Guide Signs" /></td>
</tr>
<tr>
<td><strong>Community Guide Signs</strong> (see Section 5.2.6)</td>
<td>Baseline treatment details for community-related guide and information signs are detailed in OMUTCD Part 2 and TEM Part 2. Sign supports and posts are unpainted and primarily galvanized steel. Decorative community signs, logos, and lettering are considered enhanced treatments.</td>
<td>TEM Part 2 Sign Designs and Markings Manual (SDMM) OMUTCD Part 2 BDM 209.7.2 and 800.</td>
<td><img src="image5.jpg" alt="Community Guide Signs" /> <img src="image6.jpg" alt="Community Guide Signs" /></td>
</tr>
<tr>
<td>Aesthetic Element</td>
<td>ODOT Baseline Treatment</td>
<td>ODOT Design Manual Reference</td>
<td>Example Photos</td>
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</tr>
</tbody>
</table>
| **Traffic Signals**  
(see Section 5.2.7) | **Signal Heads:** Black polycarbonate plastic with cutaway visor and louvered backplates, with fluorescent yellow reflective sheeting around outside border of backplates.  
**Signal Arms and Supports:** Galvanized support poles and mast arms. Mast arms should be straight. Span wire signals allowed where necessary. | TEM Part 4  
OMUTCD Part 4 | ![Example Photos](image1.jpg)  
![Example Photos](image2.jpg)  
![Example Photos](image3.jpg)  
![Example Photos](image4.jpg) |
| **Freeway and Interchange Lighting** | In highway medians and interchanges (where warranted), low-mast light poles with LED luminaires. Along outside shoulders, conventional truss arm light poles with LED conventional (cobra head) luminaires. Light poles shall be galvanized steel or satin-brushed aluminum. | TEM Part 11 | ![Example Photos](image5.jpg)  
![Example Photos](image6.jpg)  
![Example Photos](image7.jpg) |
| **Street Lighting** | Four baseline light pole styles are available:  
- truss arm  
- davit  
- post-top  
- monoarm  
Four baseline LED luminaire styles are available:  
- cobra head  
- teardrop  
- shoebox  
- lantern  
The lantern style can only be used with post-top poles. Teardrop luminaires should only be used in low speed areas. Poles and luminaires along low-speed facilities (by L&D Manual definition) should be painted black. Black coloring may not be used along high-speed facilities.  
Baseline street poles are smooth, round, and tapered. Light poles within the clear zone require aluminum transformer bases.  
These lighting styles may also be used on bridges, when warranted. | TEM Part 11 | ![Example Photos](image8.jpg)  
![Example Photos](image9.jpg)  
![Example Photos](image10.jpg)  
![Example Photos](image11.jpg) |
# Baseline Aesthetic Treatments Summary

<table>
<thead>
<tr>
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<th>ODOT Baseline Treatment</th>
<th>ODOT Design Manual Reference</th>
<th>Example Photos</th>
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</thead>
</table>
| **Sidewalks and Buffers** *(see Section 5.2.9)* | Sidewalk and buffer locations and widths per Figure 306-2E in L&D Volume 1.  
**Sidewalks**  
Concrete, with joints spaced approximately 5 feet apart. The surface of the concrete is finished per CMS 608.3, and must be stable, firm, and slip resistant per L&D 306.2.6. For bridge sidewalks, apply sealer to match parapet (see Section 5.1.1).  
**Buffers**  
Grass with no plantings. Seed mix per CMS 659 (Class 1 lawn mixture). | L&D Volume 1, 306.2  
CMS 608.3 and 659  
BDM 209.11 | ![Example Photos](image1).jpg  
![Example Photos](image2).jpg |
| **Medians, Islands, and Crosswalks** *(see Section 5.2.10)* | **Freeway/Expressway Medians (Non-Barrier)**  
Depressed grass median. Widths per L&D 304. Seed per CMS 659 (Class 2, roadside mixture). | L&D Volume 1, 304  
CMS 659 | ![Example Photos](image3).jpg  
![Example Photos](image4).jpg |
| **Local Road/Street Medians (Non-Barrier)** | For medians less than four feet wide, excluding shoulders, the baseline is a 6” raised solid concrete median sealed with a light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778).  
For medians greater than four feet wide, excluding shoulder, the baseline is 6” curbed, raised grass median, seeded per CMS 659 (Class 2 roadside mixture). If the length of the median is short, the width of the median varies, or a raised median would prevent desired left turns, the median may be delineated with pavement markings. | L&D Volume 1, 304  
CMS 659 | ![Example Photos](image5).jpg  
![Example Photos](image6).jpg |
## Baseline Aesthetic Treatments Summary

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<th>Example Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medians, Islands, and Crosswalks (see Section 5.2.10) (Continued)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Islands</td>
<td>Four baseline options types per L&amp;D 401.7: 1) depressed grass; 2) raised grass with 6” curb; 3) 6” raised concrete with light-neutral epoxy-urethane or non-epoxy sealer (Federal Color 17778); or 4) painted (per TEM Chapter 301 and OMUTCD Chapter 3B). Dimensions and configurations vary based on location and site conditions. Seed grassed islands per CMS 659 (Class 2, roadside mixture).</td>
<td>L&amp;D Volume 1 401.7 and 401.8 TEM Chapter 301 OMUTCD Chapter 3B CMS 659</td>
<td><img src="image1" alt="Example Photos" /> <img src="image2" alt="Example Photos" /></td>
</tr>
<tr>
<td>Crosswalks</td>
<td>Solid white (painted) transverse lines with or without solid white diagonal or longitudinal markings per TEM Chapter 301 and OMUTCD Chapter 3B.</td>
<td></td>
<td><img src="image3" alt="Example Photos" /> <img src="image4" alt="Example Photos" /></td>
</tr>
<tr>
<td><strong>Highway Landscaping (see Section 5.2.11)</strong></td>
<td>Due to safety considerations, ODOT does not plant trees, grade roadides for aesthetic purposes, or introduce other landscaping elements into highway right-of-way as a standard practice. For highway corridors, ODOT’s baseline landscaping treatment primarily includes use of various roadside and slope seed mixes as specified in CMS 659, combined with reduced backslope and infield maintenance (at select locations). Decorative landscaping in highway right-of-way is typically restricted to gateway interchange projects as aesthetic enhancements sponsored and maintained by local jurisdictions.</td>
<td>L&amp;D Volume 1, 900 CMS 651 through 671</td>
<td><img src="image5" alt="Example Photos" /> <img src="image6" alt="Example Photos" /></td>
</tr>
<tr>
<td>Aesthetic Element</td>
<td>ODOT Baseline Treatment</td>
<td>ODOT Design Manual Reference</td>
<td>Example Photos</td>
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</tr>
<tr>
<td><strong>Utilities</strong> (see Section 5.2.12)</td>
<td>Bridges&lt;br&gt;Bridges treatments are specified in BDM 203.1 and 301.7, and REM 8108.&lt;br&gt;Avoid placing utilities on bridges whenever possible. Utilities should not be placed on the fascia of bridge decks. Utilities shall not be suspended below the bottom of the superstructure or attached directly to the deck. If no other options are available, utility conduits (other than gas/water) may be embedded in bridge sidewalks (preferred), or behind the fascia beam. Roadways (Parallel Overhead Lines)&lt;br&gt;Consolidate aerial (overhead) lines on one set of poles (“joint use”) whenever possible.</td>
<td>BDM 201.3 and 301.7&lt;br&gt;Real Estate Manual (REM) Sections 8100 through 8400</td>
<td>![Example Photos]</td>
</tr>
<tr>
<td><strong>Roundabouts</strong> (see Section 5.2.13)</td>
<td>Baseline treatments for the central island loosely defined in L&amp;D 905.3.3 and essentially consists of a low earthen mound with enough plantings to achieve the purposes outlined in L&amp;D 905.3.3, including but not limited to:&lt;br&gt;- making the central island conspicuous&lt;br&gt;- blocking driver sight through the roundabout&lt;br&gt;- reducing headlight glare&lt;br&gt;- and discouraging pedestrian traffic.&lt;br&gt;As a general rule, ODOT’s baseline planting treatments for the earthen mound includes grass or basic black/brown hardwood mulch and the minimum number of plantings (grasses, flowers, low-growing shrubs, and small trees) to achieve the line-of-sight goals described in L&amp;D 905.3.3.&lt;br&gt;The baseline treatment for the truck apron is to match the material, color, and texture of the splitter islands. The exception is if the splitter islands are landscaped, in which case the apron should be concrete.</td>
<td>L&amp;D Volume I, 401.2.3, 403, and 900</td>
<td>![Example Photos]</td>
</tr>
</tbody>
</table>
## Appendix B2 - Baseline Formliner Pattern Details

<table>
<thead>
<tr>
<th>Baseline Pattern (Color)</th>
<th>Applicable Aesthetic Element</th>
<th>Example Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Groove (Light Neutral)</td>
<td>Bridge Railing (Concrete Parapet)</td>
<td><img src="image1" alt="Example Photo" /></td>
</tr>
<tr>
<td>Ashlar Block (Light Neutral)</td>
<td>Bridge Railing (Concrete Parapet) Bridge Abutments Retaining Walls</td>
<td><img src="image2" alt="Example Photo" /></td>
</tr>
<tr>
<td>Baseline Pattern (Color)</td>
<td>Applicable Aesthetic Element</td>
<td>Example Photo</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>---------------</td>
</tr>
</tbody>
</table>
| Dry Stack (Light Neutral)| Bridge Railing (Concrete Parapet)  
Bridge Abutments  
Retaining Walls | ![Example Photo](image) |
| Fractured Fin / Vertical Groove (Light Neutral)| Bridge Railing (Concrete Parapet)  
Bridge Abutments  
Retaining Walls | ![Example Photo](image) |
<table>
<thead>
<tr>
<th>Baseline Pattern (Color)</th>
<th>Applicable Aesthetic Element</th>
<th>Example Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashlar Block</td>
<td>Noise Barriers</td>
<td>Example Color: Beige</td>
</tr>
<tr>
<td>(Light Gray, Beige, or Tan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry Stack</td>
<td>Noise Barriers</td>
<td>Example Color: Light Gray</td>
</tr>
<tr>
<td>(Light Gray, Beige, or Tan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Pattern (Color)</td>
<td>Applicable Aesthetic Element</td>
<td>Example Photo</td>
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<td>--------------------------</td>
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</tr>
<tr>
<td>Fieldstone (Light Gray, Beige, or Tan)</td>
<td>Noise Barriers</td>
<td><img src="image" alt="Example Color: Tan" /></td>
</tr>
<tr>
<td>Horizontal Groove - Fiberglass (Light Gray, Beige, or Tan)</td>
<td>Noise Barriers</td>
<td><img src="image" alt="Example Color: Beige" /></td>
</tr>
</tbody>
</table>
APPENDIX C

SUPPLEMENTAL REFERENCE LIBRARY
The following are web hyperlinks to a variety of supplemental aesthetic guidance documents. These additional resources are provided for designer and stakeholder review and consideration in conjunction with ODOT's Aesthetic Design Guidelines. Note that these reference documents are for informational purposes only and the aesthetic design concepts and images in these documents may not be fully consistent with current ODOT design and/or construction specifications.

Maryland Department of Transportation – Bridge Aesthetics User Guide

Minnesota Department of Transportation – Aesthetic Guidelines for Bridge Design

Nevada Department of Transportation – Aesthetic Alternatives for NDOT Design Standards

Utah Department of Transportation – UDOT Aesthetic Guidelines

Rhode Island Department of Transportation – Best Practices Design Guide

Texas Department of Transportation – Landscape and Aesthetics Design Manual

Iowa Department of Transportation – Bridge Aesthetics

North Carolina Department of Transportation – Aesthetic Guidance Manual

Transportation Research Board – Bridge Aesthetics Sourcebook

Ohio Department of Transportation – Active Transportation Guide

Ohio Department of Transportation – Bicycle and Pedestrian Resources for Engineers

Ohio Department of Transportation - Statewide Roadside Pollinator Habitat Program Restoration Guidelines and Best Management Practices

NCHRP Report 612 – Safe and Aesthetic Design of Urban Roadside Treatments

National Association of City Transportation Officials (NACTO) – Urban Street Design Guide