# Design Narrative [Insert Project Name/Number]

[Insert Project Name/Number]

Design Milestone: [30%, 70%, 95%, Final]

## Introduction

[Provide a brief description of the project (location, major work elements, environmental document, etc.)]

[Add purpose and need]

## Major Revisions from Previous Submittal

[For each subsequent milestone after the initial milestone, provide a summary of any major updates that affect the design and project footprint. E.g., alignment changes, design criteria modifications, wall design/slope changes, etc.] For 100%, do not delete this section, mark it as “Reserved” to maintain numbering.

## Survey and Staking

[Describe the survey data (aerial, ground survey, etc…) provided, when it was obtained and in what formats]

[Provide survey datum]

[Describe staking data and formats provided.]

[Describe any additional survey that may be required for the project]

## Environmental

[Describe mitigation measures or restrictions tied to the environmental document]

[Identify sensitive resource sites and special considerations when working around these areas]

## Traffic Data

[Obtain traffic data from known sources (NPS data, state DOT databases, county counts in FLAP application, etc.). Determine construction year traffic estimate and design year estimate for use in developing design criteria. Consider seasonal variations. Note the growth rate used for calculating traffic projections. See PDDM Section 8.6.]

## Crash Data

[Obtain crash data for the project and review overall trends and problem locations.]

## Typical Sections and Pavement Design

[Brief description of typical section, stating the basis for the design criteria (or design exception)]

[Describe any current issues with the typical sections and pavement design that may impact Construction]

## Geotechnical

[Make reference to any geotechnical and/or pavement report. Briefly describe the conclusions of the reports]

[Describe any current issues with the geotechnical design that may impact Construction.]

## Hydraulics

[Make reference to any hydraulic reports that have been produced. Briefly describe the methodology used and the conclusions of the reports]

[Describe any current issues with the hydraulic design that may impact Construction]

## Erosion and Sediment Control

[Describe the design criteria and methodology used, and any acceptable alternatives to the proposed erosion control plan]

## Roadway Design

[Describe any potential problems or unknowns within the roadway design and earthwork (e.g., variations in shrink swell, unstable slopes, potential increases in subex, etc.) that may impact construction]

## Bridge Design

[Describe any bridge designs and issues involved, as applicable]

## Roadside Safety Standards (By Safety Engineer or Designer)

1. Standards

|  |  |  |
| --- | --- | --- |
| **FLH Supplemental**  **Design Standards** | | |
|  | FLH  Standard | Project Standard |
| Clear Zone |  |  |
| Barrier Crashworthiness |  |  |

[For clear zone, use the AASHTO Roadside Design Guide for projects with design speeds of 40 mph and greater. Use the [Federal Lands Highway Barrier Guide For Low Volume and Low Speed Roads](https://flh.fhwa.dot.gov/resources/design/library/FLH-Barrier-Guide.pdf) for design speeds less than 40 mph. Reference any applicable state DOT policy that may exceed these standards or provide further guidance.

For barrier crashworthiness, the Manual for Assessing Safety Hardware (MASH) is FLH draft policy and is the default. Note that devices meeting MASH are required for projects on the National Highway System (NHS). Where specific situations call for deviations, NCHRP Report 350 is the other standard. Further deviations may require consultation and proper documentation.]

1. Discussion

[Provide initial basis for any deviations (lesser or greater) than design standards.]

1. Analysis and Mitigation Countermeasures

[Provide supporting analysis forming the basis for project safety standards, deviations and recommended countermeasures to reduce roadway departures and severity of those that do occur. The extent of analysis will depend on the exposure (traffic) and scope of the project. Example references and analysis from lesser to greater scope include:

* Guidance from very-low volume roads manuals (AASHTO Guidelines for Geometric Design of Low-Volume Roads, [FLH Barrier Guide For Low Volume and Low Speed Roads](https://flh.fhwa.dot.gov/resources/design/library/FLH-Barrier-Guide.pdf))
* Barrier Warrant Considerations (Table 2.8 from FLH Barrier Guide)
* Safety Engineer analysis (e.g. Safety Assessment, Interactive Highway Safety Design Model) provides specific recommendations for countermeasures
* Benefit/Cost or Guardrail Cost Effectiveness Procedure (Roadside Safety Analysis Program (RSAP) or ROADSIDE)]

1. Barrier Design

[Describe relevant information relating to barrier design (required MASH Test Level criteria, length of need variables, any special designs), including any aesthetic requirements (weathering agent, powder coating, etc.). Reference FLH Barrier Length of Need Calculator in separate files.]

1. Partner Review

[Provide the project partner with an opportunity to review and concur with these proposed standards, any exceptions, analysis and proposed countermeasures per PDDM 9.1.3. This section could be used to highlight sensitive concerns for the partner’s review. Note the milestone review when this information was sent for partner review.]

## Temporary Traffic Control

[Describe the intent and methodology used in developing the temporary traffic control plan. Include references to specific requirements by maintaining agencies (state DOT work zone design documents, etc.). Describe any risks or potential alternatives to the proposed traffic control plan]

## Permanent Traffic Control

[Describe any issues with the signing and striping plan (striping with curve widening, installation of govt. furnished signs, etc.). Cross-reference any discussion of permanent traffic control countermeasures in XIII Roadside Safety Standards.]

## Bicycle Design [Delete if no Bicycle Facilities][…Link to EXAMPLES…](https://flh.fhwa.dot.gov/resources/design/pddm/cfl/files/Tech_Memo_examples.pdf)

|  |
| --- |
| To be completed by the Design Engineer. Delete this section if not applicable.  Describe reasons for exceptions to guidelines |

Shared-Use Path Design Guidelines: AASHTO Guide for the Development of Bicycle Facilities 2012

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **Guideline** | **As Designed** | **Exception** |
| **1. Design Speed (AASHTO 5.2.4)** |  |  |  |
| **2. Width (AASHTO 5.2.1)** |  |  |  |
| **3. Shoulder Width (AASHTO 5.2.1)** |  |  |  |
| **4. Shoulder Slope (AASHTO Figure 5-1 and 5.2.1)** |  |  |  |
| **5. Cross Slope (AASHTO 5.2.6** |  |  |  |
| **6. Horizontal Curvature (AASHTO Table 5-2)** |  |  |  |
| **7. Superelevation** |  |  |  |
| **8. Grade (AASHTO 5.2.7)** |  |  |  |
| **9. Vertical Curvature (AASHTO Figure 5-8)** |  |  |  |
| **10. Stopping Sight Distance (AASHTO Table 5-4)** |  |  |  |
| **11. Horizontal Clearance to Structure (not clear zone)** |  |  |  |
| **12. Vertical Clearance to Obstruction (AASHTO 5.2.1)** |  |  |  |
| **13. Clear Zone/Horizontal Clearance (AASHTO 5.2.1)** |  |  |  |

Descriptions of and reasons for exceptions to guidelines:

Mitigation measures: [E.g., bridge rail or hand rail design to mitigate drop-offs at bridges or walls.]

[For other bicycle facilities: describe bicycle lane, shoulder or shared-roadway design criteria used.]

## Landscaping

[Explain the involvement and intent of the Client agency in the landscaping plans.]

[Describe any special issues with seeding (time of year, seeding mix, slope preparation, etc.)]

## Rental Equipment

[Clarify the intent of any rental equipment work, and purpose of equipment within these work items.]

[Identify any additional rental equipment quantities to be used at the CO’s discretion]

## Specialty Work (as determined by the CO)

[Explain any work within the contract requiring direction from the CO. Discuss the uncertainties that resulted in the contract requiring the CO make determinations in the field. Discuss overall objectives of this work and identify support person for the CO to contact when this work is performed.]

## Right-of-Way

[Describe any unresolved right-of-way issues that may impact Construction]

[Identify potentially contentious landowners and the issues surrounding them]

## Utilities

[Describe any utility work that is part of the design and the agreements in place for temporary and permanent relocation]

## Construction Schedule

[Describe the logic, time constraints, and production rates used in developing the construction schedule]

## Construction Cost Estimate

[Briefly describe the engineer’s estimate giving the total cost. Include contingencies and inflation rates used as well as price quotes received for major work items. Identify any major work items with significant variations in the awarded unit price versus the Engineers Estimate unit price and discuss justifications or negotiations relating to those items as applicable]