



PREPARED FOR THE CITY OF FORT BRAGG

**ENGINEERING DESIGN SERVICES FOR
THE 2025 PAVEMENT PRESERVATION AND
REHABILITATION PROJECT**

Fort Bragg, California

MARCH 29, 2024



Section E

Scope of Work

Scope of Work

Our comprehensive approach to pavement maintenance projects begins with an initial meeting to understand the project scope, limits, goals, and budget. From this, we prepare a Technical Memorandum to clarify our path forward. Using a combination of aerial photogrammetry and ground survey we develop a detailed basemap including existing improvements, pavement repair areas (dig-outs), striping and signage features, and utilities. Our boots on the ground team evaluates the condition of existing infrastructure such as curbs, gutters, sidewalks, driveways, pedestrian access ramps, and drainage facilities. Items needing repair or replacement are noted for inclusion with the design. From there, we prepare a schematic design which includes a preliminary layout and conceptual plan set.

Lumos then performs an alternatives analysis to determine the most cost-effective maintenance or rehabilitation solution for the proposed roadways. Typical options considered include:

- Full Depth Pavement Patching (Dig-Outs)
- Mill and Overlay
- Pavement Crack Sealing
- Slurry Seal or Microsurfacing
- Chip or Cape Seals
- Pulverizing existing material, compaction, and asphalt concrete overlay
- Removal and replacement with conventional asphalt concrete and aggregate base
- Cement or lime-treated base
- Subgrade stabilization with geogrids or geofabrics
- Portland cement concrete paving (intersections and alleys)

We involve affected businesses, property owners, and the public to inform them about the project, gather input, and address concerns. The level of outreach varies based on the project setting and potential issues. For this project we will draft content for pre-construction notification to convey the work limits and the anticipated construction schedule.

During design development, we refine the schematic design, prepare construction notes, details, sections, profiles, technical specifications, and cost estimates (50-60% level). After reviewing with the design team and City staff, we incorporate feedback and proceed to 90% plans, specifications, and updated cost estimates. A comprehensive quality control review, including a project walk-through, is conducted. Any required agency submittals are made at this stage.

Lumos delivers final bid documents and cost estimates to the City. During bidding, we are available to answer questions, assist with bid document distribution, coordinate pre-bid meetings, prepare agendas and notes, develop addenda, review bids, and provide recommendations.

Our construction engineering services include attending the pre-construction conference, submittal reviews, responding to RFIs, investigating unforeseen site conditions, and optionally providing construction management, contract administration, staking, inspection, and materials testing.

Lumos provides all these services in-house, streamlining project management, reducing costs, and eliminating the need for subconsultants – a significant benefit for Fort Bragg.

Project Understanding

The City of Fort Bragg is systematically implementing recommendations from its Pavement Management Program to improve pavement surface conditions throughout the City. The 2025 Street Pavement Preservation and Rehabilitation Project identifies streets for improvements in the 24/25 budget cycle. This project will extend the service life of the identified streets and will be funded by local and Local Partnership Program (LPP) funds.

A preliminary budget analysis, presented later in this proposal, shows that the budget is constrained and Lumos is looking forward to working with the City to design a pavement treatment project or a more intense pavement rehabilitation project. For this proposal, a surface treatment project will include slurry seals and/or

microsurface application while a more intense rehabilitation will include mill and overlay and or removal and replacement of the structural pavement section.

Our budget has been developed assuming the implemented project will be the pavement treatment project. If the City selects the more intense pavement rehabilitation project, we can provide a revised scope and fee for that project.

Site Visit

We performed a site visit on February 16, 2024, to observe the conditions of the subject streets, curb ramps, and adjacent surface drainage facilities such as gutters and drain inlets. The streets selected for treatment and the streets selected for more intense rehabilitation are appropriate. Due to our site visit, we are able to deliver our Technical Memorandum for review during the virtual Kickoff meeting. This will save the City valuable time on the schedule.

We have performed a visual observation of the curb ramps within the project limits. Many of the curb ramps appear to have received upgrades in the recent past, based off street view photographs. It appears that many of these locations were upgraded around 2012 or later. The table below reports the number of curb ramps within the work area and the estimated quantity of ramps which will require upgrades with the project and the estimated quantity of drainage structure improvements, as a function of the selected surface treatment.

During the investigation phase of the project, we will inspect and analyze the curb ramp geometry and determine which ones require replacement or upgrade. We will also measure the storm drainage infrastructure to identify the extent of improvements needed for the 2025 project. Only minor adjustments to drain inlets are expected within the work limits of microsurfacing and pavement reconstruction. These adjustments will be made only to those adjacent to curb ramps that need ADA upgrades.

Based on our observations, we have determined the proposed improvements do not require additional exploratory efforts, such as potholing. However, if we do find any utility conflicts during our field investigation, our mark and locate subcontractor can perform the potholing. We will provide a fee for the potholing services at that time.

Treatment Method	Curb Ramps in Work Limits	Curb Ramps with Visual Deficiencies	Drainage Structure Improvements
Pavement Treatment (Microsurfacing)	56	~20	~4
Rehabilitation (Mill & Overlay)	25	~20	~3

Pavement Maintenance and Treatment in a Coastal Environment

Aaron’s previous experience with Fort Bragg is being bolstered by a discussion with Rick Cross of VSS International. VSS International was responsible for placing microsurfacing for Caltrans Project 01-0M0304 along SR20 post mile 2.0 to 17.3 between Willits and Fort Bragg in the fall of 2023. The project was constructed in the summer and fall of 2023, with favorable predicted temperatures. However, shade from the adjacent vegetation onto the work surface required additional time for the microsurface to set prior to allowing traffic on the new surface. The contractor made on the fly adjustments to the mix design to accelerate curing. These changes in mix design are common and facilitated by the project specifications.

According to the Caltrans Maintenance Technical Advisory Guide, both slurry and microsurfacing are applicable treatments in coastal regions, addressing the pavement distress observed in the subject street segments. Humidity, wind, air, and surface temperatures are important to successful application, and modifications to additives should be made to address changing environmental conditions during application.

Our Technical Specifications for the 2025 Project will include provisions that allow the contractor to make changes to the microsurface mix design to account for changing temperatures and weather conditions.

StreetSaver® Pavement Management Program

Lumos & Associates is very familiar with the use of StreetSaver®, the pavement management software that provides enhanced budgeting tools, improved data visualization capabilities, and seamless integration with GIS mapping systems. We currently use StreetSaver® on Pavement Projects for the City of Fernley, Gardnerville Ranchos General Improvement District, Alpine County, and Washoe County RTC to provide them with comprehensive and data-driven insights, that enable them to make informed decisions about their pavement

maintenance strategies. Our Project Manager, Aaron Brusatori, is certified with MTC StreetSaver® Distress and MTC Pavement Condition Assessment. Our Technical Lead, Brian Harer, has over 10 years of experience using the StreetSaver® database to assist public agencies in Maintenance and Rehabilitation (M&R) planning, budgeting, and execution of successful pavement maintenance projects.

Our team has reviewed the StreetSaver® output contained within the RFP. We have observed some of the selected treatments are not appropriate for the 2025 project. For example, Chief Celeri Drive is identified for 7,200 square feet of Full Depth Reclamation (FDR) with 4" of HMA. This street would be a better candidate for removal and replacement because the quantity of FDR, 7,200 square feet is less than a day of production for FDR and the costs to mobilize the FDR equipment for a day of work would be very expensive. We regularly perform StreetSaver® updates for many of our clients. We will update the City's StreetSaver® decision tree to include the most applicable treatments and current unit costs for planning of future projects. This will enable Lumos to prepare target driven scenarios that analyze the impact that the proposed project and future projects will have on the network PCI.

Regional Contractor Needs

The contractor pool for pavement projects in Fort Bragg typically yields two to three bids, which differs significantly from larger metropolitan centers. To address the needs of the expected bidders, the plans and specifications must be clear. Learning from previous projects in the City of Fort Bragg, it will be necessary to provide grade call outs to multiple features on each curb ramp, to reduce field math and opportunity for misinterpretation of the design. It cannot be assumed that the contractor will be able to use typical details with minimal information to correctly build the improvements.

Traffic Control

This project involves working in residential areas near schools within the city. The specifications will clearly outline the work that needs to be done during the period when school is out of session, which is typically late June to mid-August. The working hours should be scheduled in a way that does not coincide with the peak drop-off and pick-up periods around the school.

Traffic control is a significant cost on pavement maintenance projects, often greater than 10% of the bid cost. Because splitting streets and performing work to one lane at a time can be problematic in residential areas, with drivers often crossing over the fresh surface to access their driveways, we will recommend full closures of small sections of the subject streets. This will allow the contractor to work productively while balancing resident access needs. Closures will be planned for specific segments so that drivers will not have to walk too far to get to a car parked beyond the work area. For long roads without a lot of driveways, the contractor will apply surface treatment one lane at a time, splitting. We will require the contractor to clearly communicate the schedule and parking locations beyond the daily work limits, to both residents and businesses. This minor inconvenience will reduce costs and result in a better finished product.

Optimize Quantities

A design that limits the variation in pavement treatments and maximizes the quantities of work will result in greater contractor efficiencies and likely draw more contractors to the project. For example a contractor who can perform pavement treatment such as slurry seal and microsurface is not necessarily equipped to perform pavement rehabilitation such as mill and overlay. For this reason, we will recommend a project to include either pavement treatment or pavement rehabilitation, not both.

Contractor Outreach

To increase the number of bidders interested in projects, Aaron performs direct outreach to local and regional contractors during the design phase. This effort boosts project awareness and often leads to increased bidders.

Continuity with Construction Management (CM) Team

Lumos wants to ensure a smooth transition from the design phase to the construction phase of this project. We recommend advertisement for procurement of the CM team shortly after the Technical Memorandum so they can participate in the 60% design review. To help facilitate that process we will apply some lessons learned from our previous projects in the City of Fort Bragg. We will invite the CM team to our field investigation and conduct a pre-construction meeting with the CM Team to clarify the design decisions so that the Construction Team understands how and why the plans were developed as bid. This will help ensure the project goals and intents are respected throughout the construction process, with minimal change.

Complete Streets Safety Assessment

The 2022 Complete Streets Safety Assessment identified crosswalk facilities, excessive road widths, and large vehicles as contributors to safety concerns. Safety improvements were identified within the proposed work limits of the 2025 Project at the locations listed below. We can incorporate these improvements into the plans for the 2025 Project.

1. Harold St at E Laurel St – Pedestrian Median Refuge Islands
2. Harold St at E Redwood Ave – Pedestrian Median Refuge Islands
3. Harold St at E Alder St – Pedestrian Median Refuge Islands
4. Alder St at Main St (SR1) – Caltrans ROW. Recommend tasking Caltrans with implementing safety improvement within their ROW
5. Chestnut St at Dana St – Eliminate mid-block crosswalk and add sidewalk along walking lines

Pedestrian Median Refuge Islands are identified in the Complete Streets Safety Assessment for the three intersections identified above to include six islands, within the work limits of the 2025 Project. Median Islands are typically recommended when speed limits are 35 mph or greater and where the annual average daily traffic (AADT) is 9,000 or higher. We will discuss options which accomplish similar goals which are more applicable to these locations, which reduce crossing distance and slow vehicles.

Elimination of the mid-block crosswalk at Chestnut St and Dana St appears to be a low-cost safety improvement that can be included with the 2025 Project.

Lumos’ team will collaborate with the City to assess safety improvements needed at each location and if warranted, these can be added to the design of the 2025 project.

Further, the State of California Adopted AB413 in October of 2023, which requires no vehicle parking within 20 feet of the vehicle approach side of any unmarked or marked crosswalk or 15 feet of any crosswalk where curb extensions are present. Our plans will include red curb paint to prohibit parking as described, increasing pedestrian visibility and safety at crosswalks within the work area.

Local Roadway Safety Plan

Lumos has reviewed the Local Roadway Safety Plan from June 15, 2022 to determine if safety improvement countermeasures are identified within the work limits of the 2025 Project. Many of the countermeasures within the work limits are not warranted with the 2025 Project due to costs, and others due to their locations within Caltrans Right of Way. The table below identifies the countermeasures within the work limits that can be considered for inclusion with the 2025 Project. We will discuss inclusion of these countermeasures within the 2025 Project design at the Kickoff meeting.

Safety Projects identified within work limits:

Pedestrian Improvements at Unsignalized Intersections

Location	Countermeasure	Proposed Solution
Harold at Oak St	NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs. Sign replacements will be a simple low-cost change that can be included within the work limits without compromising the budget.

Systemic Roadway Segment Improvements

Location	Countermeasure	Proposed Solution
Redwood Ave; Oak St	R22	Install/upgrade signs with new fluorescent sheeting (regulatory or warning). Sign replacements will be a simple low-cost change that can be included within the work limits without compromising the budget.

Pedestrian and Other Roadway Segment Improvements

Location	Countermeasure	Proposed Solution
Redwood Ave; River Dr/Kemppe Way	R01	Add segment lighting. Overhead lights may be added to existing utility poles to improve night visibility at specific locations. This is one of the more expensive countermeasures which will require coordination with PG&E.

2004 Storm Drain Master Plan

The 2004 Storm Drain Master Plan studied the existing drainage system and impacts based on projected growth of the City of Fort Bragg. With the City not growing at the projected rate, many of the improvements identified within the 2004 Storm Drain Master Plan may not be necessary. At the 60% design level, we will discuss observed flooding and storm water drainage conditions with the City Operations and Maintenance team to determine if there are any drainage issues within the work limits which need to be added to the 2025 project. If Storm Drainage improvements are warranted, a specific scope and fee will be prepared to address those drainage improvements.

Preliminary Construction Budget

The RFP clarifies surface treatment such as seal and microsurfacing are priority with more intense rehabilitation like mill and overlay as a secondary priority. Using unit costs projected from the 2022 Street Rehabilitation Project and Caltrans Project EA 01-0M0304 - MEN-20-2.0/17.3 we have estimated budgets for two projects, respecting the given priority. For both projects, application of Slurry Seal to E Oak St. is included as a bid alternative to provide projects that can be completed within budget.

The budget estimates include improvements identified in the **Complete Streets Safety Assessment** and the **Local Roadway Safety Plan** identified on the previous page. Because this is a pavement preservation project, we are not anticipating improvements to the storm drain system.

We understand the construction budget is approximately \$2.2M. We will need to work with the City to find alternative bids that maximize work within budget constraints. It is envisioned that a bid alternative would include streets that are candidates for slurry seal as they can be added to the project without requiring the design of additional curb ramp improvements.

Preliminary Budget

Surface Treatment - Slurry and Microsurface	Quantity	Units	Unit Cost	Total
Mobilization	1	LS	10%	\$169,957
Traffic Control	1	LS	12%	\$203,948
Remove & Replace Stripe/Legends/Markings	722,875	SF	\$0.55	\$397,581
4" Digouts (Local Streets)	17,500	SF	\$11.00	\$192,500
Microsurface	350,000	SF	\$2.00	\$700,000
Curb Ramps	20	EA	\$7,000.00	\$140,000
Slurry Seal Type II (Bid Alt)	372,875	SF	\$0.59	\$221,488
Median Pedestrian Refuge Islands	6	EA	\$8,000.00	\$48,000
Planning Level Contingency			25%	\$357,520
				\$2,430,994

Bid Alternative: Slurry Seal Type II - East Oak Street Restriped w/2022 Project

Remove & Replace Stripe/Legends/Markings	145,125	SF	\$0.55	\$79,819
Slurry Seal Type II (Bid Alt)	145,125	SF	\$0.59	\$85,624

Pavement Reconstruction and Slurry Seal	Quantity	Units	Unit Cost	Total
Mobilization	1	LS	10%	\$155,207
Traffic Control	1	LS	12%	\$186,248
Replace Stripe/Legends/Markings	522,875	SF	\$0.55	\$287,581
4" Digouts (Local Streets, Est. 10%)	15,000	SF	\$11.00	\$165,000
Cold Plane (Assume 1.5" Material Removal)	150,000	SF	\$1.00	\$150,000
2" Asphalt Overlay	150,000	SF	\$3.60	\$540,000
Curb Ramps	20	EA	\$7,000.00	\$140,000
Slurry Seal Type II	372,875	SF	\$0.59	\$221,488
Median Pedestrian Refuge Islands	6	EA	\$8,000.00	\$48,000
Planning Level Contingency			25%	\$320,645
				\$2,214,169

Bid Alternative: Slurry Seal Type II - East Oak Street Restriped w/2022 Project

Remove & Replace Stripe/Legends/Markings	145,125	SF	\$0.55	\$79,819
Slurry Seal Type II (Bid Alt)	145,125	SF	\$0.59	\$85,624

Scope of Work

1. Project Management

We will provide project coordination, administration, and quality control. We will coordinate field activities with City staff. We will participate in project meetings with Staff and City Council or the Public Works and Facilities Committee, and prepare agenda and minutes for each. Our Project Manager will perform brief check-in calls, approximately twice each month. We will monitor budget and schedule and prepare monthly status reports for inclusion with our monthly invoices.

Deliverables:

- Kickoff Meeting – agenda, minutes, .pdf
- City Council or PW & Facilities Committee Meeting – Present Technical Memorandum, .pdf
- 60% Design Review Meeting – agenda, minutes, .pdf
- Bi-Weekly Check-In Calls
- Monthly Status Reports and Invoices, .pdf
- Schedule Maintenance (4 updates), .pdf format
- Public Outreach - Draft Pre-construction Flyer Content, .docx

2. Technical Memorandum

We will prepare a Technical Memorandum to report assessment of the existing conditions and recommend appropriate pavement treatments. The Technical Memorandum will include schematic design (10%) showing the limits of improvements. We will refine the budget estimates reported above for inclusion. The Technical Memorandum will be presented to City Staff and the City Council or Public Works & Facilities Committee for procedural direction. Comments received from Staff, Council, or Public Works and Facilities Committee members will be incorporated into the final Technical Memorandum, to document our path forward.

Deliverables:

- Draft Technical Memorandum
- Final Technical Memorandum

3. Investigate Existing Conditions

We will dispatch a crew to verify the conditions of the roadways proposed for treatment and to evaluate ADA compliance of the existing curb ramps. We will simultaneously perform topographic data collection.

Verification will Include:

- Assessment of each roadway section and verification that the roadway meets the criteria for a surface treatment
- Identification of locations needing asphalt patching (dig-outs)
 - Identify locations needing crack sealing
 - Recommendation of slurry required (i.e., Type 2, Type 3, Micro, Double Micro, Cape Seals, Fog Seals, etc.)
 - Verification of existing striping conditions
 - Evaluation of drainage infrastructure
 - Evaluation of pedestrian access ramps
 - Mapping of the proposed streets will include the roadway areas, islands, striping, utility valves and manholes using a combination of aerial photogrammetry and ground collected survey field shots
 - Curb ramps will be evaluated using a combination of ground shots by Total Station and smart level analysis
- Topographic Survey
 - Collect field data and prepare a topographic survey map including all existing surface improvements, striping/pavement markings, visible evidence of utilities, inverts of all measurable utilities adjacent to proposed work will be shown
 - Survey 20 curb ramps within the limits of the microsurface pavement treatment area
- Aerial Photogrammetric Mapping
 - Set flyover targets and collect color aerial images to show the painted limits from our ground field investigation

Deliverables:

- Existing Conditions Mapping: PDF map
- Aerial Image: Digital format, GIS enabled

4. Plans, Specifications, and Estimates

Using the data collected from our field investigation and topographic mapping, we will prepare construction documents for submittal at the 60%, 90% and 100% design. We will track comments with a Comment Resolution Matrix to ensure all comments written or verbal have been incorporated.

Quality Assurance reviews will be performed prior to each submittal. At the 90% submittal an independent constructability review will be performed to ensure the documents communicate the intended improvements. This review will be performed by an engineer that has not previously worked on the project and come delivered in a digital and hard copy.

Plans to Include:

- Title/Legend/Details (4 sheets)
- Surface Improvement Plans (20 sheets)
- Curb Ramp Details, 20 Locations (5 sheets)
- Striping (20 sheets)

Deliverables:

- AutoCAD drawings of the proposed work showing treatment areas including slurry limits, dig-outs and locations of existing utility valves and manholes
- Preliminary: PDF map of preliminary candidates and engineer's estimate
- 60% plans and bid item descriptions
- 90%: PDF of project plans, contract documents, and engineer's estimate
- 100% Issued for Bid (IFB): PDF of project plans, contract documents, and engineer's estimate. PDF of Sheet Index/Vicinity Maps extracted from the IFB Plans. IFB Contract Documents in Microsoft Word Format. IFB ENGR Estimate of Probable Cost in Excel format. One bound hard copy of 22"x34" project plans
- Quantities for each street identified for preventative maintenance treatment
- Verification of existing striping, including striping quantities for each street identified for preventative maintenance treatment and/or included for restriping
- Striping plans which will include striping upgrades required to bring streets to current MUTCD or agency requirements
- Preparation of bid documents using current templates as provided by the City

5. Bid Period and Construction Support

We will assist the City with solicitation of bids and analysis of bids received. During this period will respond to contractor questions and prepare up to one bid addendum. We will conduct a pre-construction conference with the low-bidder, CM team, and the City. This will include preparing notice to bidders, responding to questions during the bidding process (preparing, tracking, and sending addendum/s), reviewing submitted bids for accuracy and preparing recommendation of award to the City of Fort Bragg, attending and conducting a pre-construction conference, and responding to contractor RFIs.

Deliverables:

- Notice to Bidders
- Up to one addendum
- Pre-construction agenda and minutes
- Response to contractor RFIs