



UNIVERSITY FACILITIES MANAGEMENT

Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
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ADDENDUM NO. 1 – BID PACKAGE INFORMATION

Project Name: 2025 PARKING MAINTENANCE PPA No.: 22-1177
Location: PLEW BUIDLING, 113, Bozeman, MT 59717 Date: 01-30-2025

To: *All Plan Holders of Record*

*The Plans and Specification prepared by **DJ&A P.C.** dated **01-30-2025**, shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.*

The Bidders are to acknowledge the receipt of this Addendum by inserting its number and date into their Bid Forms. Failure to acknowledge may subject the Bidder to disqualification and rejection of the bid. This Addendum forms part of the Contract Documents as if bound therein and modifies them as follows:

I. **AMENDMENTS TO THE PROJECT MANUAL**

A. **MSU BID PROPOSAL LONG FORM 098**

ADD – Item A18 STALL NUMBERING PAVEMENT MARKING for unit tabulation table.

REPLACE – Items A2, A8, A9, A10, with updated bid tabulation estimated quantities.

B. **SPECIFICATIONS 02581**

REPLACE – Specification 02581. Specification was replaced to remove unused sections and add additional descriptions of curb paint and curb paint application.

II. **AMENDMENTS TO THE DRAWINGS**

A. **SHEET GP0-1**

REPLACE – ALL with ALL LOOSE. Note now specifies the contractor shall remove all loose curb paint prior to the application of new curb paint.

B. **SHEET CP1-1**

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

REPLACE – Arrows/Misc Pavement Marking with itemized markings.

C. **SHEET CP1-2 – CP1-9, CP1-13, CP1-15(N)**

REPLACE – Arrows/Misc Pavement Marking with itemized markings.

D. **SHEET CP-15(S)**

ADD – Stall pavement numbering quantity in EA.

E. **SHEET CP1-19**

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

REPLACE – Arrows/Misc Pavement Marking with itemized markings.

F. **SHEET CP1-20**

ADD – Red Curb paint locations.

ADD – Red Curb Paint quantity.

UPDATED – Curb Paint Removal quantity.

ADD – STALL NUMBERING PAVEMENT MARKING quantity in EA.

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

G. **SHEET CP1-25**

ADD – Red Curb paint locations.

ADD – Red Curb Paint quantity in LF.

ADD – Curb Paint Removal quantity in LF.

ADD – STALL NUMBERING PAVEMENT MARKING quantity in EA.

ADD – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

H. **SHEET CP1-21**

DELETE – Yellow curb paint on Lincoln St. Striping on Lincoln in this area is outside the scope of work for this project.

I. **SHEET CP1-22**

REPLACE – Arrows/Misc Pavement Marking with itemized markings.

J. **SHEET CP1-26 – CP1-29**

REPLACE – Arrows/Misc Pavement Marking with itemized markings.

K. **SHEET CP1-31, CP1-32**

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

L. **SHEET CP1-34**

REPLACE – YELLOW CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

M. **SHEET CP1-37**

REPLACE – REPAINT CURB callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

N. **SHEET CP1-41,CP1-42**

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

O. **SHEET CP1-49**

REPLACE – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

ADD – RED CURB PAINT callout with RED CURB PAINT & STENCILED “NO PARKING FIRE LANE”.

P. **SHEET C5-1**

REPLACE – 4” YELLOW EPOXY with 4” YELLOW WATER-BASED PAINT.

ADD – PARKING ARROWS Detail (4/C5-1).

ADD – STALL NUMBERING PAVEMENT NUMBERING Detail (5/C5-1).

ADD – FIRE LANE CURB MARKING Detail (6/C5-1).

III. GENERAL INFORMATION

A. GENERAL

Clarifications:

1. All loose curb paint shall be removed prior to the application of new curb paint.
2. The note “**REPAINT “NO PARKING”, TYP.**” includes the removal of existing paint and the application of a new 18-inch white “**NO PARKING**” pavement marking.
3. Quantities for directional arrow symbols, “**STOP**”, “**NO PARKING**”, and stall numbering have been itemized separately on all applicable sheets for Contractor convenience. The unit of measurement for each pavement marking will remain as EA. Each unit includes the removal of existing paint and the application of new 18-inch “**NO PARKING**” pavement marking.
4. All new pavement markings shall be applied in two (2) coats.

5. An exhibit for the Stadium Lot Parking Stall Pavement Numbering is included in this Addendum. This exhibit is included as a reference for parking stall numbering in the Stadium Lots, CP1-20 and CP1-25.



BID PROPOSAL
PARKING MAINTENANCE 2025
PPA No. 24-1177

TO:
 State of Montana, Montana State University
 University Facilities Management
 Attn: Contract Administrator
 Plew Building, 6th & Grant,
 PO Box 172760
 Bozeman, Montana 59717-2760

Prospective Bidders:

The undersigned, having familiarized themselves with the Contract Documents, site, location, and conditions of the Work as prepared by **DJ & A, 220 W Lamme, Suite 1D, Bozeman, MT, 59715, 406-721-4320**, by submission of this Bid Proposal, hereby agrees to provide all materials, systems, equipment and labor necessary to complete the Work for the total sum as follows:

BASE BID UNIT TABULATION:

	ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
M1	MOBILIZATION & MISC WORK	1	LS		
A1	SWEEPING	2,528,979	SF		
A2	PAIN T REMOVAL	17,726 18,907	LF		
A3	CRACK SEALING	5,353	LB		
A4	HEAVY SEAL COAT	220,326	SF		
A5	GRAVEL LOT GRADING	71,200	SF		
A6	IMPORTED 3/4" BASE GRAVEL	55	CY		
A7	4" STRIPING	141,572	LF		
A8	CURB PAINT – YELLOW	9,835 9,460	LF		
A9	CURB PAINT – RED/FIRE LANE	7,608 9,447	LF		
A10	DIRECTIONAL ARROW SYMBOL	233 19	EA		
A11	"STOP" MARKING	17	EA		
A12	"NO PARKING" MARKING	188	EA		

ITEM		ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
A13	"NO PARKING" HATCH AREA	56,804	SF		
A14	CROSSWALK	28	EA		
A15	STORM DRAIN CLEAN-OUT	14	EA		
A16	PARKING GARAGE – SWEEP	129,152	SF		
A17	PARKING GARAGE - POWERWASH	129,152	SF		
A18	STALL NUMBERING PAVEMENT MARKING	1,533	EA		
TOTAL FOR BASE BID					\$

_____ and _____ /100 DOLLARS
(ALPHA notation) \$ _____ (NUMERIC notation)

This bidder acknowledges receipt of the following addenda:

ADDENDUM No.: _____ Dated: _____
ADDENDUM No.: _____ Dated: _____
ADDENDUM No.: _____ Dated: _____

By signing below, the bidder agrees to all terms specified and AGREES TO fulfill the requirements of the CONTRACT in strict accordance with the bidding documents.

Company Name: _____

Business Address: _____

Construction Contractor
Registration No.: _____

Phone No.: _____

Fax No.: _____

Email: _____

Date: _____

Bid Proposals entitled to consideration shall be signed by the proper representative of the firm submitting

the proposal as follows (Initial which requirement you meet):

- The principal of a single owner firm;
- A principal of a partnership firm;
- An officer of an incorporated firm, or an agent whose signature is accompanied by a certified copy of the resolution of the Board of Directors authorizing that agent to sign; or (attach a copy of the resolution),
- Other persons signing for a single-owner firm or a partnership shall attach a power-of-attorney evidencing his authority to sign for that firm.

Signature: _____

Print Name: _____

Title: _____

SECTION 02581
PAVEMENT MARKINGS AND MARKERS
(PRE-FORMED PLASTIC, PAINTS AND ENAMELS)

PART 1 -- GENERAL

1.1 -- DESCRIPTION

- A. ~~This work is painting pavement lines, words and symbols, or applying plastic lines, words, symbols, channelization buttons, and other reflective markers meeting these specifications, the standard drawings, and in reasonably close conformity with the lines and dimensions shown in the contract documents or established by the Engineer.~~

PART 2 -- PRODUCT

2.1 -- PRE-FORMED PLASTIC PAVEMENT MARKING MATERIAL

- A. ~~Furnish plastic pavement markings and legends consisting of reflectorized, pre-fabricated, homogeneous, thermoplastic ribbon of the specified thickness. Assure the plastic contains reflective glass spheres uniformly distributed throughout its cross section and is capable of being affixed to bituminous or Portland Cement concrete pavements using a liquid contact cement or pre-coated, pressure-sensitive adhesive. Furnish white and yellow meeting standard highway colors. Assure the white plastic material is non-yellowing, and the yellow plastic material is non-fading for their expected useful life.~~
- B. ~~For strip line widths of 6 inches or less, furnish plastic pavement striping material in a single manufactured width equal to the specified width. For specified stripe line widths exceeding 6 inches, furnish plastic pavement striping material in a single manufactured width equal to the specified width or in two or more widths totaling the specified width.~~
- C. ~~Cut the plastic marking material edges clean and true. Use at least 0.09-inch thick plastic material for inlaying into new asphaltic surfaces. Use at least 0.06-inch thick plastic material for application to existing surfaces or to hardened new surfaces.~~
- D. ~~Assure plastic pavement markings for inlay into new asphaltic surfaces are capable of being applied just before the final rolling of the new surface and can be rolled into place with conventional pavement rollers. For inlay applications, assure the plastic and adhesive are not damaged by pavement temperatures exceeding 175° F (79° C) or by water on roller drums.~~
- E. ~~Assure the plastic pavement marking material and its adhesive are tack free to provide easy handling without using a protective backing and can be repositioned on the surface before being permanently fixed in position. Pre-coated adhesive must be uniformly distributed over the entire contact surface of the plastic material.~~
- F. ~~Furnish plastic pavement marking material capable of molding itself to pavement contours, breaks, and other surface irregularities under traffic at normal pavement~~

temperatures. Assure the plastic material will fuse with itself and with previously applied markings of the same composition under normal use conditions.

- G. — Assure pavement legends and symbols meet the applicable shapes and sizes specified by the “Manual on Uniform Traffic Control Devices” as adopted by the FHWA.
- H. — Assure product agents or distributors furnish the manufacturer’s specifications showing that the material furnished meets or exceeds these requirements and submit evidence of successful product use over a one-year period under similar climatic conditions. Plastic pavement marking material not meeting this use requirement will be rejected.
- I. — Submit a 4 inch by 1-foot sample from each lot of plastic material proposed for use on the project to the Engineer for approval. Use only approved plastic pavement marking material on the project.

1. — Composition Requirements

- i. — Furnish pre-formed plastic pavement marking material consisting of plasticizers, pigments, and graded glass spheres combined and proportioned to meet the following requirements.
 - a) — Pigments: Minimum 20 percent titanium dioxide of total pigment for white marking material; minimum 18 percent medium chrome yellow of total pigment for yellow marking material. Use graded glass spheres that are clean, transparent, and meet the requirements of Section 02581.2.02.A.1. Assure the glass spheres are uniformly distributed throughout the entire material.

2. — Physical Requirements

i. — Tensile Strength

- a) — Assure the plastic material has a minimum tensile strength of 40 psi of cross section when tested under ASTM D638. The break resistance is based on an average of at least three (3) samples tested at a temperature of 70° – 80° F (22° – 27° C) using a jaw speed of 0.25 inches per minute.

ii. — Plastic Pull Test

- a) — A 1”-6” sample of the plastic material must support a dead weight of 0.66 lb per 0.01 inch of material thickness for at least 5 minutes at 70° – 80° F (22°-27° C).

iii. — Bend Test

- a) — The plastic material must be flexible so that at 80° F (27° C), a 3” by 6” sample of the material can be bent over a 1” diameter mandrel until

~~the end faces are parallel and 1" apart without showing any fracture lines in the uppermost surface under unassisted visual inspection.~~

~~iv. Skid Resistance~~

- ~~a) The surface friction of the plastic cannot be less than 35 BPN when tested under ASTM E303.~~

~~v. Reseal Test~~

- ~~a) The plastic must reseal to itself without adhesives when tested as follows: Overlap 2 1/2-inch by 3-inch piece face-to-face so that they form a single 1-inch by 5-inch with a 1 square inch overlap in the center.~~
- ~~b) Place the piece on a hard surface with a 1000-gram weight resting uniformly on the entire overlap area and maintain at 140° to 190° F (60°-88° C) for 2 hours. The actual temperature to be maintained depends on the material being tested but must be within the specified range. After cooling to room temperature, the pieces must not separate without tearing.~~

~~vi. Reflectivity~~

- ~~a) Furnish reflective pavement marking material having reflective values not less than those listed in the table below. Reflective values are measured under Federal Specifications L-S-300C. The reflective values must be measured on a 2 by 2-1/2 foot panel at 85° incidence and be expressed as average candlepower per foot-candle per 5 square feet of material.~~

Divergence Angle White Yellow

0.2 Degrees	0.20	0.15
0.5 Degrees	0.15	0.10

2.2 WATERBORNE PAVEMENT MARKING PAINT

~~A. Waterborne Pavement Marking Paint~~

- ~~1. Furnish acrylic latex white and lead-free yellow waterborne pavement marking paint meeting the following requirements.~~
 - ~~i. Composition—The exact composition is at the manufacturer's discretion except that the vehicle is to be 100 percent acrylic polymer and the paint is not to contain any ingredient listed below.~~
 - ~~a) Lead or chromate compounds; mercury; lead; chromate compounds; chlorinated solvents; hydrolysable chlorine derivatives; ethylene-~~

~~based glycol ethers and their acetates.~~

~~b) Meet the following requirements:~~

	<u>White</u>	<u>Yellow</u>
Pigment, % solids ASTM D-3723	68 max	68 max
Total Solids, % by weight ASTM D-2369	75 min	75 min
Titanium Dioxide, lbs./gal. ASTM D-4563 & D-1394	1 lb. min.	0.15 lb.
% Non-volatile vehicle of total vehicle weight ASTM D-2697	41 min.	41 min.
VOC content, maximum EPA Method 24	150 g/L	150 g/L
pH, min. ASTM E-70	9.6	9.6
	<u>White</u>	<u>Yellow</u>
Viscosity (Krebs Stormer), K.U., ASTM D-562 @ 77°F, (25° C)	80-95	80-95
Grind, Hegman, min. ASTM D-1210	2	2
Deviation in percent weight per gallon, max. (from manufacturer specified weight)	±.30	±.30
Daylight ¹ Reflectance, min. ASTM D-2805	85	59.1 ²
Contrast Ratio, 15 mils wet min., ASTM D-2805	0.92	0.88

~~¹The Y-Tristimulus value (luminance) is obtained using a standardized Tristimulus colorimeter using a C illuminant at a two-degree observation angle. The paint sample is drawn to a 15-mil wet film thickness over a white substrate. The department uses a Hunter Lab Miniscan XE Colorimeter and Leneta Corporation Form 5C opacity charts to determine this value.~~

~~²Color to match the V+ color on the Hale color chart ±6%.~~

ASTM TEST _____ WHITE AND YELLOW

D 711 mod.¹ _____ Dry Time, 15 mil wet film, 65% RH, minutes, max. 10

D1640 mod.² _____ Dry Through @ 90% RH, 15 mil wet film, minutes, max. 130

ASTM TEST WHITE AND YELLOW

D 2243³ Freeze-Thaw, White and Yellow Pass

D 2486 Scrub Resistance, cycles min.....
600

D-969 Bleeding Ratio, min.....
- - -

¹Use a wet film thickness of 15 plus or minus 1 mil. Immediately place in a humidity chamber controlled at 65±3% relative humidity and 72.5° F ± 2.5° F (22.5°C ± 1.4° C) with minimal airflow.

²Apply a 15± 1 mil thick film to a non-absorbent substrate and place in a humidity chamber controlled at 85±5% R.H. and 72.5°F ± 2.5°F (22.5°C ± 1.4°C). Determine dry through time under ASTM D 1640 exerting the minimum pressure needed to maintain contact with the thumb and film.

³See B(7), Freeze-Thaw Stability.

c) — Titanium. Use Titanium Dioxide meeting ASTM D-476, Type I or II.

ii. — Characteristics

a) — Flexibility and adhesion. Apply 15 mil wet film thickness to a 3" by 5" (75 mm by 130 mm) tin panel. Dry at 77°F (25°C) for 24 hours followed by two hours at 122°F (50°C). Bend sample over a ½-inch (13 mm) mandrel. Paint to adhere firmly without showing cracking or flaking.

b) — Water resistance. Apply 15 mil wet film thickness to a 4" by 8" (102 mm by 203 mm) glass plate. Dry at 77°F (25°C) for 72 hours. Immerse in distilled water at 77°F (25°C) for 24 hours. Air dry for two hours on a flat surface. Paint to not show blistering or adhesion loss.

c) — Skinning and lumps. Fill a pint (0.473 L) container ¾ full of paint and

seal tightly. After 72 hours, strain paint through a 100 mesh screen. No lumps or skin retained on the screen is permissible.

- d) ~~Settling. Fill a centrifuge tube with paint and revolve for two hours at 1112 Newtons (250 ft/lbs). Separation from top of vehicle to top of pigment not to exceed 13 mm (1/2-inch).~~
- e) ~~Skinning. Fill ½ pint (0.236 L) container half full of paint and seal. Let stand for 24 hours. No skinning to be visible.~~
- f) ~~Bleeding. When tested under ASTM D-969, paint to not show perceptible bleeding when painted on a bituminous surface.~~
- g) ~~Freeze-thaw stability. When tested under ASTM D-2243, paint to not show coagulation or viscosity change exceeding 10 Krebs units.~~
- h) ~~Static heat stability. Pour paint into a pint (473 mL) within 0.25 inches (6.4 mm) of the top, put the lid on and seal with tape, and place the container in an oven heated to 60°C ± 1°C (140°F ± 2°F) for seven days. Equilibrate the paint at standard conditions and thoroughly mix by stirring for at least five minutes. Ensure the paint does not show signs of livering, hard settling, coagulation, lumps or coarse particles. Perform a consistency test meeting ASTM D-562 at 25°C (77°F). Paint viscosity to not vary 10 K.U. from the original viscosity measured at 25°C (77°F).~~

iii. ~~Packaging and Marking. Meet subsection 714.04.9 requirements.~~

iv. ~~Sampling and Acceptance. Draw three samples meeting subsection 714.04.8 requirements.~~

v. ~~Retro-reflective Glass Beads. Use silene-coated moisture resistant glass beads meeting subsection 714.05 requirements.~~

vi. ~~Application. Follow the manufacturer's requirements for pavement cleaning and traffic paint application or as follows, whichever is more restrictive.~~

- a) ~~Apply to a dry surface.~~
- b) ~~Clean the pavement of all loose rock, dirt, and debris immediately before applying the traffic paint.~~
- c) ~~Do not heat the traffic paint to exceed 110°F (43.3°C) before and during application.~~
- d) ~~Apply the traffic paint when the ambient temperature is 50°F (10°C) and rising. Stop application when the temperature is 50°F (10°C) and dropping and when rain or other weather adverse to the traffic paint~~

during its drying time is imminent.

- e) — Apply traffic paint at 15 mils (0.38 mm) wet thickness in a single application meeting subsection 620.03.3(A).
- f) — Remove and replace all defective pavement marking damaged by weather at Contractor expense.
- g) — Re-paint, at Contractor expense, all striping represented by paint samples where any specified property is outside 20 percent of the specified value.

vii. — Reflective Glass Beads

- a) — Glass beads for use in reflectorizing traffic paint markings on pavement by the drop-on method must be spherical and transparent with smooth, lustrous surfaces. The beads, as delivered, must be spherical and transparent with smooth, lustrous surfaces. The beads, as delivered, must be free from extraneous material and clumps of beads that cannot be broken up easily when applying to the stripe.
- b) — Imperfections — The glass beads cannot include more than 25 percent irregularly shaped particles when tested under ASTM D1155. Assure the beads are free of scratches, pits, milkiness, dark particles, and excessive air bubbles.
- c) — Color — The glass beads must be colorless to the extent that they do not impart a noticeable daytime hue to white pavement markings.
- d) — Chemical Stability — The beads must withstand refluxing in distilled water in a Soxhlet extractor for 90 hours without noticeable dulling of surface luster and not more than 2.5 percent loss in weight.
- e) — Index of refraction — The glass from which the beads are made must have an index of refraction of at least 1.50 by the immersion method using tungsten light.
- f) — Gradation — Assure the glass beads meet the following gradation requirements when tested under the Standard Method of Test for Sieve Analysis of Glass Spheres, ASTM D1214.

<u>Sieve No.</u>	<u>Total Percent Passing</u>
20	100%
30	75-95%
50	15-35%
100	0-5%

- g) — Packaging and Marking — Furnish glass beads in bags containing 50

lb. (26 kg) net. Assure the shipping bags are moisture proof, paper-lined burlap bags meeting specification ICG-36-C under Interstate Commerce Commission Regulation Section 78-234. Mark each bag with the name of contents, manufacturer of beads, and net weight.

h) — Certification — Submit certification from a testing laboratory approved by the Engineer certifying the beads meet these expectations.

PART 3 – EXECUTION

3.1 — APPLICATION OF PLASTIC PAVEMENT MARKING MATERIAL

- A. — Apply plastic pavement marking materials only to clean, dry surfaces free of paint, dirt, and foreign matter. On newly constructed surfaces to which a sealer has been applied, clean the surface receiving the plastic pavement marking to neutralize any acid and remove the sealer.
- B. — Apply following the manufacturer's recommended procedures. Apply plastic pavement marking materials only to surfaces at temperatures within the range specified by the manufacturer for optimum adhesion.
- C. — When activators are required for the adhesive or when various special coatings are required for different pavement surfaces, supply such information to the Engineer, indicating special application procedures.
- D. — Assure the width and layout of stripes or the area of application of plastic pavement markings and legends meet the dimensions shown in the contract documents or standard drawings.
- E. — Before applying the plastic striping material, the Engineer will establish control points on the roadway for striping alignment. The Engineer will establish control points every 100 feet on tangent, at least every 100 feet on curves of 2 degrees or less, and at 50-foot intervals for curves over 2 degrees. The Engineer will also designate other pavement striping locations such as stop bars, crosswalks, and the like. Maintain all lines within 2" of established lines.
- F. — Place asphaltic surfacing on the roadway just before final compaction and roll into the new surface during final completion. Assure pavement markings or legends are flush with the finished surface.

3.2 — PAINTING TRAFFIC LINES

- A. — Clean the surface to be painted for dirt, rocks, gravel and any other foreign matter. Apply the paint by hand or mechanical means consistent with the scope of the job. Assure the width and layout of stripes or the area to be painted meets the plans or standard drawings.
- B. — Paint the top and traffic side of curbs at those locations where parking is to be

~~restricted, as shown in the contract documents or in the pavement marking manual. Paint the top and traffic sides of all island curbs, median curb, and other specified curb. Paint by uniformly applying one (1) coat of yellow traffic line paint meeting the requirements of Section 02581.2.2.A.1 as applicable. Paint the curb after it has cured at least 30 days after being cast. Apply the paint at a rate that the curb surface is completely covered and hidden. Assure surfaces to be painted are clean and free of all foreign matter before painting.~~

- ~~C. Before applying paint, mark the roadway between control points established by the Engineer. The Engineer will establish such control points on tangent every 100 feet and on curves at least every 100 feet for under 2-degree curves and at 50-foot intervals on curves over 2-degree curvature. Maintain the line within 2" of the established lines. The Engineer will also designate other pavement striping locations such as stop bars, crosswalks, and the like.~~
- ~~D. Apply highway traffic striping during daylight hours when the air and pavement temperatures are 40° F (4° C) or higher, the pavement surface is dry and the weather is not foggy, rainy, or stormy.~~
- ~~E. Apply paint and glass beads with equipment manufactured specifically for that purpose and using workmen experienced in operating such equipment. Locate the bead applicator directly behind and synchronized with the paint applicator. Assure both devices are shielded to avoid spraying of paint or loss of beads outside of the designated width of line. Assure the equipment is also capable of painting a stripe or stripes of the specified width with a tolerance of plus or minus ¼ inch. In "no passing zones", the machine must be able to paint three (3) stripes simultaneously. For centerline painting, assure the machine is equipped with an automatic skip control giving the specified broken-line pattern within a tolerance of 6 inches over each cycle.~~
- ~~F. Use hand-operated equipment to stripe stop bars, crosswalks, and other areas not readily accessible to the pavement striping machine.~~
- ~~G. Apply the pavement striping paint at the following rates per gallon:
 - ~~1. Four-inch stripe — at least 250 but not more than 275 linear feet per gallon.~~
 - ~~2. Four-inch dashed stripe (9-foot stripe-15-foot gap) — at least 665 but not more than 735 linear feet per gallon.~~
 - ~~3. Four-inch dashed stripe (10-foot — 30-foot gap) at least 1000 but not more than 1100 linear feet per gallon.~~~~
- ~~H. Apply beads at the rate of 6 pounds per gallon of paint, plus or minus 0.1 pound.~~
- ~~I. For quality control, the Engineer will check the application at the beginning of each day's paint striping and as often as considered necessary. If equipment settings fail to produce quality striping within the limits specified, stop striping work until corrected.~~

- J. ~~Protect all markings until dry by placing approved guarding or warning devices as necessary. Correct all markings smeared or otherwise damaged at no expense to the owner.~~
- K. ~~Sufficient quantities of paint have been included in the contract to provide for an interim application and a final application of traffic line paint. The need for applying an interim application will be determined by the Engineer.~~
- L. ~~When plastic pavement markings are specified, use paint for the interim markings of the specified color and apply as specified in the contract documents. The final application must be plastic.~~
- M. ~~Apply two (2) full applications of the specified centerline and shoulder line striping on open graded friction course and seal coat pavement surfaces meeting the following table. Apply the second application a minimum of 30 days after the first application.~~

3.3 ~~PAVEMENT STRIPING – OGFC AND SEAL COATED SURFACES~~

	Pavement Surface Type	Number of Applications	Striping Application Direction of Travel	
			First Application	Second Application
	2-lane	2	Not Specified	Apply in opposite direction of first application
OGFC and Seal Coated Surfaces	2-way	2	Apply in same direction as traffic flow	Apply in same direction as traffic flow
	4-way			

*All transverse lines must receive two (2) applications applied in opposite directions

3.4 ~~REMOVAL OF PAVEMENT MARKINGS~~

- A. ~~As shown in the contract documents or directed by the Engineer, remove temporary pavement markings or markings that are no longer appropriate to the roadway.~~
- B. ~~Approved methods of removing markings include sand blasting with air or water; high pressure water; steam or superheated water; mechanical grinders, sanders, scrapers, brushes, burning, and the like.~~
- C. ~~Choose, subject to Engineer approval, the removal method best suited to the existing condition of the paint and pavement surface.~~
- D. ~~No other methods of removal other than those specified here will be allowed. The contractor may make written request to the Engineer for approval to use other methods, materials, or equipment. The Engineer may subsequently disapprove any prior approved method should it prove detrimental to the pavement surface or inadequate in removing the markings.~~
- E. ~~Remove sand or other material deposited on the pavement resulting from removing traffic markings as the work progresses. If the striping removal results in light or discolored lines on the roadway, cover the areas with a thin asphalt fog coat. Repair all~~

~~damage to the pavement or surfacing caused by pavement marking removal at no cost to the owner.~~

PART 4 - MEASUREMENT AND PAYMENT

4.1 - GENERAL

- ~~A. Plastic pavement striping is measured for payment by the number of linear feet of line of the specified width and thickness in place and accepted. Length of dashed, longitudinal pavement line is the actual length placed, e.g. 25% of the total roadway length where 10-30 lines gap ratio is used.~~
- ~~B. Plastic pavement marking words and symbols are measured for payment by the number of square feet of words and symbols in place and accepted.~~
- ~~C. Painted traffic lines, words, and symbols are measured for payment by the number of gallons of paint used and accepted.~~
- ~~D. Unless otherwise provided in the contract, removal of pavement markings is measured for payment by the linear foot. Words and symbols are measured by the square foot and converted to the equivalent linear foot of 4 inches wide line.~~
- ~~E. Paint and painting of curbs, island curbs, and median curbs in accordance with Section 02581.3.2 are measured by the actual gallons of paint used and accepted.~~
- ~~F. Plastic pavement striping is paid for at the contract unit price per linear foot of striping of the specified width and thickness.~~
- ~~G. Plastic pavement marking words and symbols are paid for at the contract unit price per square foot of plastic words and at the contract unit price per square foot plastic words and symbols. Payment for plastic lines, words, and symbols is full compensation for furnishing all necessary materials and equipment and doing all required work.~~
- ~~H. Painting of traffic lines and words and symbols is paid for at the contract unit price per gallon for "Highway Traffic Striping" complete in place, including the furnishing and application of beads. Payment is full compensation for all work necessary to complete the item.~~
- ~~I. Removal of pavement markings is paid for at the contract unit price per linear foot.~~
- ~~J. The cost of paint and the painting of curbs, island curbs, and median curbs in accordance with Section 02581.3.2 are paid for at the contract unit price per gallon for curb marking.~~

END OF SECTION

**SECTION 02581
PAVEMENT MARKINGS AND MARKERS
(PAINTS AND ENAMELS)**

PART 1 GENERAL

1.1 DESCRIPTION

- A. This work is painting pavement lines, words and symbols, or applying plastic lines, words, symbols, channelization buttons, and other reflective markers meeting these specifications, the standard drawings, and in reasonably close conformity with the lines and dimensions shown in the contract documents or established by the Engineer.

PART 2 PRODUCT

2.1 PRE-FORMED PLASTIC PAVEMENT MARKING MATERIAL
Not Used

2.2 WATERBORNE PAVEMENT MARKING PAINT

- A. Waterborne Pavement Marking Paint
1. Furnish acrylic latex white, red, and lead-free yellow waterborne pavement marking paint meeting the following requirements.
 - a. Composition – The exact composition is at the manufacturer’s discretion except that the vehicle is to be 100 percent acrylic polymer and the paint is not to contain any ingredient listed below.
 - 1) Lead or chromate compounds; mercury; lead; chromate compounds; chlorinated solvents; hydrolysable chlorine derivatives; ethylene-based glycol ethers and their acetates.
 - 2) Meet the following requirements:

	<u>White</u>	<u>Yellow</u>	<u>Red</u>
Pigment, % solids ASTM D-3723	68 max	68 max	-
Total Solids, % by weight ASTM D-2369	75 min	75 min	55.3 min
Titanium Dioxide, lbs./gal. ASTM D-4563 & D-1394	1 lb. min.	0.15 lb.	-
% Non-volatile vehicle of total vehicle weight ASTM	41 min.	41 min.	-
VOC content, maximum EPA Method 24	150 g/L	150 g/L	<100 g/L
pH, min. ASTM E-70	9.6	9.6	8.3
	<u>White</u>	<u>Yellow</u>	<u>Red</u>
Viscosity (Krebs Stormer), K.U., ASTM D-562 @ 77°F, (25° C)	80-95	80-95	-
Grind, Hegman, min. ASTM D-1210	2	2	-
Deviation in percent weight per (from manufacturer specified weight)	±.30	±.30	-
Daylight ¹ Reflectance, min. ASTM D-2805	85	59.1 ²	-
Contrast Ratio, 15 mils wet , ASTM D-2805	0.92	0.88 min.	-

¹The Y-Tristimulus value (luminance) is obtained using a standardized Tristimulus colorimeter using a C illuminant at a two-degree observation angle. The paint sample is drawn to a 15-mil wet film thickness over a white substrate. The department uses a Hunter Lab Miniscan XE Colorimeter and Leneta Corporation Form 5C opacity charts to determine this value.

²Color to match the V+ color on the Hale color chart $\pm 6\%$.

ASTM TEST

WHITE AND YELLOW

D 711 mod. ¹	Dry Time, 15 mil wet film, 65% RH, minutes, max. 10
D1640 mod. ² 130	Dry Through @ 90% RH, 15 mil wet film, minutes, max.

ASTM TEST

WHITE AND YELLOW

D 2243 ³	Freeze-Thaw, White and Yellow Pass
D 2486	Scrub Resistance, cycles min..... 600
D-969	Bleeding Ratio, min.....

¹Use a wet film thickness of 15 plus or minus 1 mil. Immediately place in a humidity chamber controlled at $65 \pm 3\%$ relative humidity and $72.5^\circ \text{F} \pm 2.5^\circ \text{F}$ ($22.5^\circ \text{C} \pm 1.4^\circ \text{C}$) with minimal airflow.

²Apply a 15 ± 1 mil thick film to a non-absorbent substrate and place in a humidity chamber controlled at $85 \pm 5\%$ R.H. and $72.5^\circ \text{F} \pm 2.5^\circ \text{F}$ ($22.5^\circ \text{C} \pm 1.4^\circ \text{C}$). Determine dry through time under ASTM D 1640 exerting the minimum pressure needed to maintain contact with the thumb and film.

³See B(7), Freeze-Thaw Stability.

3) Titanium. Use Titanium Dioxide meeting ASTM D-476, Type I or II.

b. Characteristics

- 1) Flexibility and adhesion. Apply 15 mil wet film thickness to a 3" by 5" (75 mm by 130 mm) tin panel. Dry at 77°F (25°C) for 24 hours followed by two hours at 122°F (50°C). Bend sample over a 1/2-inch (13 mm) mandrel. Paint to adhere firmly without showing cracking or flaking.
- 2) Water resistance. Apply 15 mil wet film thickness to a 4" by 8" (102 mm by 203 mm) glass plate. Dry at 77°F (25°C) for 72 hours. Immerse in distilled water at 77°F (25°C) for 24

- hours. Air dry for two hours on a flat surface. Paint to not show blistering or adhesion loss.
- 3) Skinning and lumps. Fill a pint (0.473 L) container $\frac{3}{4}$ full of paint and seal tightly. After 72 hours, strain paint through a 100 mesh screen. No lumps or skin retained on the screen is permissible.
 - 4) Settling. Fill a centrifuge tube with paint and revolve for two hours at 1112 Newtons (250 ft/lbs). Separation from top of vehicle to top of pigment not to exceed 13 mm (1/2- inch).
 - 5) Skinning. Fill $\frac{1}{2}$ pint (0.236 L) container half full of paint and seal. Let stand for 24 hours. No skinning to be visible.
 - 6) Bleeding. When tested under ASTM D-969, paint to not show perceptible bleeding when painted on a bituminous surface.
 - 7) Freeze-thaw stability. When tested under ASTM D-2243, paint to not show coagulation or viscosity change exceeding 10 Krebs units.
 - 8) Static heat stability. Pour paint into a pint (473 mL) within 0.25 inches (6.4 mm) of the top, put the lid on and seal with tape, and place the container in an oven heated to $60^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($140^{\circ}\text{F} \pm 2^{\circ}\text{F}$) for seven days. Equilibrate the paint at standard conditions and thoroughly mix by stirring for at least five minutes. Ensure the paint does not show signs of livering, hard settling, coagulation, lumps or coarse particles. Perform a consistency test meeting ASTM D-562 at 25°C (77°F). Paint viscosity to not vary 10 K.U. from the original viscosity measured at 25°C (77°F).
- c. Packaging and Marking. Meet subsection 714.04.9 requirements.
 - d. Sampling and Acceptance. Draw three samples meeting subsection 714.04.8 requirements.
 - e. Retro-reflective Glass Beads. Not used.
 - f. Application. Follow the manufacturer's requirements for pavement cleaning and traffic paint application or as follows, whichever is more restrictive.
 - 1) Apply to a dry surface.
 - 2) Clean the pavement of all loose rock, dirt, and debris immediately before applying the traffic paint.
 - 3) Do not heat the traffic paint to exceed 110°F (43.3°C) before and during application.

- 4) Apply the traffic paint when the ambient temperature is 50°F (10°C) and rising. Stop application when the temperature is 50°F (10°C) and dropping and when rain or other weather adverse to the traffic paint during its drying time is imminent.
- 5) Apply traffic paint at 15 mils (0.38 mm) wet thickness in a single application meeting subsection 620.03.3(A).
- 6) Remove and replace all defective pavement marking damaged by weather at Contractor expense.
- 7) Re-paint, at Contractor expense, all striping represented by paint samples where any specified property is outside 20 percent of the specified value.

g. Reflective Glass Beads
Not used

PART 3 EXECUTION

3.1 APPLICATION OF PLASTIC PAVEMENT MARKING MATERIAL NOT USED

3.2 PAINTING TRAFFIC LINES

- A. Clean the surface to be painted for dirt, rocks, gravel and any other foreign matter. Apply the paint by hand or mechanical means consistent with the scope of the job. Assure the width and layout of stripes or the area to be painted meets the plans or standard drawings.
- B. Paint the top and traffic side of curbs at those locations where parking is to be restricted, as shown in the contract documents or in the pavement marking manual. Paint the top and traffic sides of all island curbs, median curb, and other specified curb. Ensure surfaces to be painted are clean and free of all foreign matter before painting.
 1. Yellow Curb Paint: Apply one (1) coat of yellow curb paint meeting the requirements of Section 02581.2.2.A.2, as applicable. Apply the paint at a rate that ensures the curb surface is completely covered and hidden.
 2. Red Fire Lane Curb Paint: At designated fire lane locations, Apply (1) coat of red curb paint meeting the requirements of Section 02581.2.2.A.2 and apply a white stencil with the words "FIRE LANE NO PARKING" as specified in the contract documents. Ensure uniform application of red fire lane paint and proper stencil alignment for legibility. The red paint shall conform to applicable fire lane marking standards.
- C. Use hand-operated equipment to stripe stop bars, crosswalks, and other areas not readily accessible to the pavement striping machine.
- D. Apply the pavement striping paint at the following rates per gallon:
 1. Four-inch stripe – at least 250 but not more than 275 linear feet per

gallon.

2. Four-inch dashed stripe (9-foot stripe-15 foot gap) – at least 665 but not more than 735 linear feet per gallon.
 3. Four-inch dashed stripe (10 foot – 30-foot gap) at least 1000 but not more than 1100 linear feet per gallon.
- E. For quality control, the Engineer will check the application at the beginning of each day's paint striping and as often as considered necessary. If equipment settings fail to produce quality striping within the limits specified, stop striping work until corrected.
- F. Protect all markings until dry by placing approved guarding or warning devices as necessary. Correct all markings smeared or otherwise damaged at no expense to the owner.
- G. Sufficient quantities of paint have been included in the contract to provide for an interim application and a final application of traffic line paint. The need for applying an interim application will be determined by the Engineer.

3.3 REMOVAL OF PAVEMENT MARKINGS

- A. As shown in the contract documents or directed by the Engineer, remove temporary pavement markings or markings that are no longer appropriate to the roadway.
- B. Approved methods of removing markings include sand blasting with air or water; high pressure water; steam or superheated water; scrapers, brushes, burning, and the like.
- C. Choose, subject to Engineer approval, the removal method best suited to the existing condition of the paint and pavement surface.
- D. No other methods of removal other than those specified here will be allowed. The contractor may make written request to the Engineer for approval to use other methods, materials, or equipment. The Engineer may subsequently disapprove any prior approved method should it prove detrimental to the pavement surface or inadequate in removing the markings.
- E. Remove sand or other material deposited on the pavement resulting from removing traffic markings as the work progresses. If the striping removal results in light or discolored lines on the roadway, cover the areas with a thin asphalt fog coat. Repair all damage to the pavement or surfacing caused by pavement marking removal at no cost to the owner.

END OF SECTION

WEST KAGY BLVD

SOUTH 11TH AVE

SOUTH 7TH AVE

BOBCAT ATHLETICS COMPLEX

BOBCAT STADIUM

MSU IPF BUILDING

FOR MSU PURPOSES ONLY - COLORS DO NOT AFFECT STALL NUMBER PAINTING. Numbers shown in this exhibit are to show/demonstrate the correct number to be stenciled/painted. See detail 5/C5-1 on the 2025 Parking Maintenance sheet set.

Key

- Reserved Single Stall
- Reserved Single Stall-ADA
- Tailgate- Two Stalls
- Tailgate- Two Stalls- Likely To Be Lost in Future Kagy Expansion
- RV- Four Stalls

