

January 27, 2010

Large Plow Truck Acquisition
REQUEST FOR BIDS
RFB 10-1718

Vendor

The Muskegon County Board of Commissioners invites your bid on Large Plow Truck Acquisition for the Muskegon County Airport. A set of conditions and specifications/requirements are enclosed.

Bids are due in the Muskegon County Purchasing Office, Central Services Building, 141 East Apple Avenue, Muskegon, MI 49442, no later than 3:00 PM prevailing time, Wednesday, February 10, 2010.

The time of receipt shall be determined by the time clock stamp in the Purchasing Office. Bidders are responsible for insuring that their bids are stamped by Purchasing Office personnel by the deadline indicated.

No late bids will be accepted.

Mr. Joseph Siedenstrang
Accounting Manager

TABLE OF CONTENTS

	<u>PAGE</u>
I Advertisement As It Appeared In Local Paper	1
II Bid Certification/Non-Collusion Affidavit.....	2
III Bid Summary/Addendum Summary	3
IV Bid Conditions/Instructions To Bidders	4
V General Provisions.....	12
VI Technical Specifications.....	26
VII References.....	54

LARGE PLOW TRUCK ACQUISITION
REQUEST FOR BIDS
RFB 10-1718

The Muskegon County Board of Commissioners invites your bid on Large Plow Truck Acquisition.

The project consists of furnishing all material and equipment for the following:

Acquisition of Large Plow Truck consisting of two (2) large front displacement plows and carrier vehicles including underbody plows and material spreader systems on both vehicles.

Equipment shall include all necessary attachments, accessories and appurtenances.

Bid request forms are available in the Muskegon County Purchasing Office, Central Services Building, 141 East Apple Avenue, Muskegon, MI 49442 or the Muskegon County Purchasing website at www.co.muskegon.mi.us/financeandmgt/pur_cs.htm. Bids are due in the Purchasing Office, no later than 3:00 PM, prevailing time, Wednesday, February 10, 2010.

Equipment acquisition will be financed and paid for using federal, state and local funds received by the County of Muskegon, Michigan.

No late bids will be accepted. The Board reserves the right to accept or reject any or all bids, reserves the right to waive formalities and to take such action as it deems necessary in the best interest of the County of Muskegon. The County of Muskegon operates on an equal opportunity basis in its bidding policy (Title VII of Civil Rights Act of 1964, Equal Opportunity Clause, Executive Order 11246, Chapter 60, Subpart A, 60-I.4, Revised Order No. 4). Bidding is open to all interested parties, in compliance with national, state and local laws.

The project shall be completed within 180 days from date of Purchase Order.

Joseph Siedenstrang
Accounting Manager

BID CERTIFICATION / NON-COLLUSION AFFIDAVIT

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, equipment or service, that it meets or exceeds all the specifications contained herein, and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of state and federal law, and can result in fines, prison sentences, and civil damage awards. I agree to abide by all conditions of this bid, all specifications as stated, all bid prices, and certify that I am authorized to sign for the bidder.

Vendor: _____

Street Address: _____

City/State/Zip Code: _____

Phone No.: _____

Fax No.: _____

E-mail: _____

Web Site: _____

Signature: _____

Signer's Name Printed: _____

Title: _____

Date Certified: _____

BID SUMMARY

All cost (including shipping, handling and all other costs) must be included in the total bid price.

Bidders are to submit prices on the lines (spaces) provided below. Every line (space) must contain a figure, zero (0) or line (-). Failure to complete the bid summary as stated above shall be cause for rejection of bid.

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	Large Displacement Plow including Carrier Vehicle, Underbody Plow and Material Spreader System with Hopper, As Specified	2	Each	_____ _____	_____ _____
TOTAL BID:					

Please initial below acknowledging receipt of any addendums (give number and date of each). If none were received, please indicate this as well.

Addendum Number	Addendum Date	Initials
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Company Name _____
 Signature _____
 Printed Name _____

BID CONDITIONS/INSTRUCTIONS TO BIDDERS

These conditions are an integral part of this bid, and the vendor must comply with them.

1. **Bid Submittals**

Vendor must bid on this form and as requested. **Vendor must submit two (2) copies of Bid Summary along with two copies of the Buy American Certificate, Notice to Bidders forms for each plow type.**

Vendor should make copy of bid for his or her file.

The vendor's name and address must appear on the outside of the envelope. The bid must be sealed.

The vendor must place the attached sticker in the center of the bid envelope. If the bid was downloaded from the internet then, the vendor must clearly write the bid name and number on the outside of the envelope along with the vendor's business name.

2. All cost (including shipping, handling and all other costs) must be included in the total bid price as stated on the Bid Summary page.

Bidders are to submit prices on the lines (spaces) provided on the Bid Summary page(s). Every line (space) must contain a numeric figure, zero (0) or line (-). Failure to complete the bid summary as stated above shall be cause for rejection of bid.

3. **Delivery Date**

The delivery time or completion date, as stated in the bid form, shall be the time required to deliver and complete item(s) after the receipt of the order or award of the contract. Where multiple items appear on a bid request, the bidder/offeror shall, unless otherwise stated by the County, show the delivery time for each item separately.

State anticipated delivery date _____

All prices must be FOB Destination, unloaded inside and assembled unless otherwise indicated.

4. **Invoices and Payment Terms**

Invoices are to be mailed to the County department on the resulting purchase order. All invoices must include the purchase order number, federal grant number and state contract number. Failure to comply may result in delayed payments. The County will forward invoices to the Michigan Department of Transportation (MDOT) for payment in accordance with MDOT published procedures. The payment term shall begin on the date the merchandise is inspected, delivered and accepted by the County and the correct invoice is received in the office specified on the purchase order.

5. State the maximum time this bid will be in force _____
(Minimum 180 Days)

6. **Specification Inquiries**

If there are any questions concerning the specifications contained in this Bid Request, please contact (Mr. John Stroo, Prein&Newhof, Project Engineer) at (616-364-8491).

7. Bid Procedure Inquiries
If there are any questions regarding bid procedures, please contact the Purchasing Office at (231) 724-6281.
8. State manufacturer's name and number where requested.
9. Brochures and Literature
Enclose brochure(s) with bid.
10. Vendor Samples
Samples of items when required, must be furnished free of expense to the County and upon request, be returned to the Vendor at the Vendor's expense. Samples of selected items may be retained for comparison purposes.
11. Commission Privilege
The Board of Commissioners reserves the right to accept or reject any or all bids in whole or in part, reserves all rights granted to it by law, reserves the right to waive formalities and to take such action as it deems necessary in the best interest of the County of Muskegon.
12. Legal Requirements
Federal, State, County and local ordinances, rules and regulations, and policies shall govern development, submittal and evaluation of bid and disputes about bids. Lack of knowledge by a vendor about applicable law is not a defense.
13. Bidder/Offeror Representation
Each bidder/offeror must sign the bid with his/her usual signature and shall give his/her full business address on the form provided in this bid.

Bids by partnership shall be signed with the partnership name by one of the members or by an authorized representative. Bids by corporations shall be signed with the name of the corporation followed by the signature and designation of the president, secretary or other person authorized to bind it in the matter.
14. Subcontracting
No portion of this bid may be subcontracted without the prior written approval by the County. It may be in the best interest of the awardee to subcontract some parts of any given job; however, the contractor will be held responsible by the County for the quality, delivery and all terms and conditions of this bid.
15. Assignment
Any purchase order awarded shall not be assignable by the vendor without the express written approval of the County and shall not become an asset in any bankruptcy, receivership or guardianship proceedings.
16. Civil Rights
A. The Vendor assures that in accordance with General Provision, Section 9 titled "Airport and Airway Improvement Act of 1982, Section 520, General Civil Rights Provisions, 49 U.S.C. 47123", Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title IX of the Education Amendment of 1972, as amended (20 U.S.C. 1681-1683 and 1685-1686), the Age

Discrimination Act of 1975, as amended (42 U.S.C. 6101 et seq.), the Regulations issued thereunder by the U.S. Department of Health and Human Services (45 CFR Parts 80, 84, 86, and 91), the Michigan Handicapper's Civil Rights Act (1976, P.A. 220), and the Michigan Civil Rights Act (1976, P.A. 453), no individual shall, on the ground of race, creed, age, color, national origin or ancestry, religion, sex, marital status, or handicap be excluded from participation, be denied the benefit of, or be otherwise subjected to discrimination under any program or activity provided by this Vendor.

Assurance is given to County that good faith efforts will be made to identify and encourage the participation of minority, women and handicapper owned businesses in contract solicitations. The vendor shall incorporate language in all contracts awarded: (1) prohibiting discrimination against minority, women, and handicapper owned business in subcontracting; and (2) making discrimination a material breach of contract.

B. The Vendor assures that it meets the requirements of the Americans with Disabilities Act, Public Law 101-336, enacted July 26, 1990.

C. The Vendor assures that it meets the requirements of the Drug Free Workplace Act of 1988, 34 CFR Part 85, Subpart F.

17. Rejection of Bid

Bids may be considered irregular and may be rejected if they show omissions, alterations of form, additions not called for, conditions, limitations or other irregularities of any kind. The County reserves the right to waive minor technicalities or irregularities of bid.

18. Award

The County shall award to the overall lowest responsible and responsive vendor complying with the provisions of the bid. The following criteria may be considered by the County in selecting the most advantageous bid: a) Ability to perform the service required within the specified time; b) Conformance to specification; c) The quality of performance in previous contracts; d) Financial ability to perform the contract; e) Item pricing; f) vendor references.

The County reserves the right to award the bid in whole or in part based on available funds. Award of partial bid will be at the County's sole discretion and will be made by deleting whole units of equipment. Unit prices for each piece of equipment shall include all costs associated with that piece of equipment as specified. No adjustment to per each unit prices will be considered based on partial award.

19. Bidder/Offeror Qualifications

No bid shall be accepted from and no contract will be awarded to any person, firm or corporation that is in arrears to the County upon debt or contract that is a defaulter, as surety or otherwise, upon any obligation to the County, or that is deemed irresponsible or unreliable by the County. If requested, bidders/offers shall be required to submit satisfactory evidence that they have a practical knowledge of the particular supply/service bid and that they have the necessary financial resources to provide the proposed supply/service as described in the Specifications.

20. Vendor/Bidder Complaints or Protests

The County of Muskegon has established administrative procedures for handling vendor's complaints in a fair and timely manner. Vendors should observe the following steps in order

to file complaints:

Step 1

The vendor must contact the Accounting Manager within seven (7) days of the incident about which he or she has a complaint. The Accounting Manager may request the vendor to present the complaint in writing if it is serious and/or the vendor is requesting a delay of the purchase award.

The Accounting Manager will investigate the complaint and review all findings with the County Administrator. The Accounting Manager will reply verbally or in writing to the vendor after discussion with the County Administrator.

Step 2

If the vendor is dissatisfied with the Accounting Manager's reply, an appeal must be made in writing within seven (7) days to the County Administrator or the Muskegon County Board of Commissioners.

21. Material Safety Data Sheet

Each vendor shall provide the County of Muskegon with a complete copy of the U.S. Department of Occupational Safety and Health Administration, Material Safety Data Sheet, (Form OSHA-20) for each product you are using on this project, if hazardous materials are being used.

22. Errors/Omissions/Discrepancies

Any errors, omissions or discrepancies in the specifications discovered by a prospective contractor and/or service provider shall be brought to the attention of the Accounting Manager as soon after discovery as possible. Further, the contractor and/or services provider shall not be allowed to take advantage of errors, omissions or discrepancies in the specifications.

23. Bid Opening

Bids will be opened and read publicly in the Central Services Building, 141 East Apple Avenue, Muskegon, MI at 3:00 PM, prevailing time, February 10, 2010.

No bid award will be made at the time of the opening.

24. Telegraphic/Electronic Bid Submittal

Telegraphic and/or bid offers sent by electronic devices (e.g. facsimile machines or electronic mail) are **not** acceptable and will be rejected upon receipt. Proposing firms will be expected to allow adequate time for delivery of their bid either by airfreight, postal service, or other means.

25. Bid Changes

No late bids will be accepted.

Bids, amendments thereto, or withdrawal requests received after the time advertised for bid opening will be void regardless of when they were mailed.

26. Purchase Order

A purchase order will be issued to the successful vendor after the bid has been awarded by the Board. The County of Muskegon shall not be responsible for any goods delivered or

services performed without a purchase order issued and signed by the Accounting Manager or an authorized representative.

27. Bid Results

Vendors submitting bids who wish to know the results before the award is made, may visit the website at <http://www.co.muskegon.mi.us/financeandmgt/bidtabulations.cfm> , call the Muskegon County Purchasing Office at (231) 724-6281, or visit the office. After the award is made, the bid results will be posted on the Muskegon County Purchasing website.

28. Taxes

Sales Tax: For purchases made directly by the County of Muskegon, the County is exempt from State and Local Sales Tax. Prices shall not include such taxes. Exemption Certificates for County Sales Tax will be furnished upon request.

Federal Excise Tax: The County of Muskegon may be exempt from Federal Excise Tax, or such taxes may be reimbursable, if articles purchased under this contract are used for the County's exclusive use. Certificates exclusive use is for the purposes of substantiating a tax-free, or tax-reimbursable sale will be sent to the contractor upon request. If a sale is tax exempt or tax reimbursable under the Internal Revenue Codes, prices shall not include the Federal Excise Tax.

The County's Tax Exempt Certification is available for bidder viewing upon request. http://www.co.muskegon.mi.us/financeandmgt/pur_forms.htm
The County's Federal ID # is 38-6006063.

29. Pronouns

For the benefit of brevity, when the pronouns "he" or "his"/ "she" or "her" are used, it is not intended to denote the gender of any person.

30. Exceptions

The bidder shall furnish a statement on company letterhead giving a complete description of all exceptions to the terms, conditions and specifications. Failure to furnish the statement will mean that the bidder agrees to meet all requirements of the terms, conditions and specifications.

31. Brand Names

Unless otherwise specified, manufacturer's names, trade names, information and/or catalog numbers listed in the specifications are intended only to identify the quality and characteristics desired. They are not intended to limit competition. The vendor may offer any equivalent product which meets or exceeds the specifications. If bids are based on equivalent products, the quote must: a) indicate the alternate manufacturer's name and catalog number; b) include complete descriptive literature and/or specifications; c) include proof that the proposed equivalent will meet the specifications. The County reserves the right to be the sole judge of what is equal and acceptable to meet its needs in all respects. If bidder fails to name a substitute, goods identical to the specified standard must be furnished.

32. Ownership and Use of Documents

a. All documents prepared in connection with this agreement will become the property of the County whether any project related to this agreement is executed or not.

- b. The vendor will retain all of its records and supporting documentation relating to this agreement, and not delivered to the County, for a period of three years, except that in the event the vendor goes out of business during that period, it will turn over to the County all of its records relating to the project for retention by the County.
33. Termination for Convenience
Muskegon County may terminate a contract, in whole or in part, whenever the County determines that such termination is in the best interest of the County, without showing cause, upon giving notice to the vendor. Muskegon County shall pay all reasonable costs incurred by the vendor up to the date of termination. However, in no event shall the vendor be paid any amount which exceeds the price bid for the work performed. The vendor will not be reimbursed for any profits which may have been earned up to the date of termination.
34. Termination for Default
When the vendor has not performed or has unsatisfactorily performed the contract or in the event any of the provisions of the purchase order are violated, the County may serve written notice of its intention to terminate the contract and/or purchase order for default. Upon termination for default, payment will be withheld at the discretion of Muskegon County. Failure on the part of a vendor to fulfill the contractual obligations shall be considered just cause for termination of the contract. The vendor will be paid for work satisfactorily performed prior to termination less any excess costs incurred by the County in procuring and completing the work.
35. Termination Due to Unavailability of Funds in Succeeding Fiscal Years
When funds are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal year, the contract shall be canceled and the vendor shall be reimbursed for a reasonable value of any non-recurring costs incurred, but not amortized in the price of the supplies or services delivered under the contract.
36. Rights and Remedies of County for Default
If any item furnished by the vendor fails to conform to specifications, or to the sample submitted by the vendor, the County may reject it. Upon rejection, the vendor must promptly reclaim and remove such item without expense to the County, and shall immediately replace all such rejected items with others conforming to such specification and samples. If the vendor fails to do so, the County has the right to purchase in the open market a corresponding quantity of any such items and to deduct from any monies due the vendor the difference between the prices named in the purchase order and the actual cost to the County. If the vendor fails to make prompt delivery of any item, the County has the right to purchase such item in the open market and to deduct from any monies due the vendor the difference between the prices named in the purchase order and the actual replacement cost to the County. The rights and remedies of the County identified above are in addition to any other rights and remedies provided by law or under the purchase order.
37. Avoidance of Conflict of Interest and Confidentiality
The vendor may provide consultation services to other government organizations in Michigan and elsewhere. In order to preserve the trust and confidence of their client, the contractor adheres to a set of principles that enables them to perform their work in a manner that is free of real or perceived conflicts of interests. These principles are as follows:

- a. Vendor will not discuss, distribute or use in any way the data or information acquired in the course of providing services to Muskegon County without prior approval by the county.
 - b. Vendor will not undertake a specific activity which may be viewed as adverse to the interests of another client without obtaining the agreement of both parties.
 - c. Vendor states that no County officer or employee, nor any business entity in which they have an interest: a) Has an interest in the contract awarded; b) Has been employed or retained to solicit or aid in the procuring of the resulting contract; c) Will be employed in the performance of such contract without immediate disclosure of such fact to the County.
41. Bid conditions/instructions to bidders, specifications/requirements may become part of a contract for this product/service.
42. Freedom of Information Act
Bids will be available for public inspection after the award announcement, except to the extent that a bidder designates trade secrets or other proprietary data to be confidential. Material designated as confidential must be readily separable from the remainder of the bid to facilitate public inspection of the non-confidential portion of the bid. A bidder's designation of material as confidential will not necessarily be conclusive and the bidder may be required to provide justification why such material should not be disclosed, on request, under the Michigan Freedom of Information Act.
43. Debarment
If a bidder is presently debarred, suspended, proposed for debarment, declared ineligible, or otherwise excluded from doing business with any government agency which prohibits your firm from participating in any procurement, the bidder must provide the County with that information as part of its response to this solicitation. Failure to fully and truthfully provide the information required, may result in the disqualification of your bid from consideration or termination of the purchase order, once awarded.
44. Bidder Registration
If the successful bidder is not registered with the County of Muskegon as a vendor, the bidder will be required to complete a vendor registration in order to be awarded the bid. If the awarded bidder does not submit the completed registration to the Purchasing Office within 48 hours of its being notified of the award, the County may determine that the bidder shall be deemed not responsive and not be considered for an award.

If the vendor is a DBE (Disadvantaged Business Enterprise), the vendor is encouraged to complete the Unified Certification Application and become a certified vendor with the County of Muskegon.

GENERAL PROVISIONS

Table of Contents

Section 1:	Guarantee
Section 2:	Design, Construction and Materials
Section 3:	Standardization
Section 4:	Identification Plates
Section 5:	Certifications
Section 6:	Compliance with Regulatory Requirements
Section 7:	Compliance with Federally Assisted Contracts Regulatory Requirements
Section 8:	Non-Construction Contract, Civil Rights Act of 1964, Title VI, 49 CFR Part 21, Contractual Requirements
Section 9:	Airport and Airway Improvement Act of 1982, Section 520, General Civil Rights Provisions
Section 10:	Access to Records and Reports 49 CFR Part 18.36(i)
Section 11:	Rights to Inventions 49 CFR Part 18.36(i)(8)
Section 12:	Disadvantaged Business Enterprises 49 CFR Part 26
Section 13:	Lobbying and Influencing Federal Employees 49 CFR Part 20
Section 14:	Trade Restriction Clause 49 CFR Part 30
Section 15:	Termination of Contract 49 CFR Part 18.36(i)(2)
Section 16:	Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion 49 CFR Part 29
Section 17:	Breach of Contract Terms 49 CFR Part 18.36
Section 18:	Energy Conservation Requirements
Section 19:	Clean Air and Water Pollution Control
Section 20:	Buy American Preferences
Section 21:	Delivery
Appendix A:	Prohibition of Discrimination in State Contracts

Section 1: Guarantee

The BIDDER must guarantee in writing that for a period of one year from the date of delivery, he will, at his own expense and without expense to the SPONSOR, replace all failed parts and make all repairs that may be necessary and required by reason of defective design, workmanship or material in any part of the assembly of the equipment here in specified. In addition, the BIDDER must guarantee, in writing, that he will maintain spare parts in support of any equipment herein specified, that may be purchased as a result of this proposal and will make them available for purchase for a period of not less than ten (10) years from the date of delivery.

Section 2: Design, Construction and Materials

The equipment and accessory design shall be of the best engineering practices and shall permit accessibility for use, maintenance and service. All components shall be free of hazardous protrusions, sharp edges, cracks or other elements, which might cause injury to personnel or equipment. All oil, hydraulic and air tubing lines and electrical wiring shall be located in protective positions properly attached to the frame of body structure and shall have a protective loom or grommet at each point where they pass through structural members, except where a through-frame connector is necessary. The vehicle shall be constructed so that no part can work loose in service. The vehicle shall be built to withstand the strains, jars, vibrations and other conditions incident to service intended. Design of the vehicle shall produce the necessary clearances to permit satisfactory use of all drive wheels when traveling adverse terrain. Materials shall be of the best quality used for the purpose in commercial practice. Materials shall be free from all defects and imperfections that might affect the serviceability of the finished product.

Section 3: Standardization

All components, sub-assemblies, equipment and accessories not originally manufactured by the BIDDER must be installed by or in strict conformance with the standard installation and use requirements of the manufacturer of such items. Any modifications to these standard installation and use requirements must be evidenced by the written concurrence of the manufacturer of such components, sub-assemblies, equipment or accessories. Documentation of concurrence must be submitted when required, in writing, by the SPONSOR. BIDDER must state the basic model number, which the equipment is listed or referred to in a publication of recognized standing in the industry. In addition, the BIDDER must submit all available specifications, data and descriptive literature covering the equipment proposed in response to the proposal.

Section 4: Identification Plates

Identification plates of sufficient size to be easily read must be conspicuously displayed and securely fastened on the engine, chassis controls, compartments, valves and all other components showing all information necessary for the proper identification and/or operation of these units. Similarly, identification plates or other suitable methods indicating operational parameters for pressure, temperature, tachometer and other similar critical operation indicators are required.

Section 5: Certifications

The successful BIDDER will be required, prior to acceptance of and payment for the delivered equipment to provide, upon the written request of the SPONSOR, a "Certification of Suitability" for all driveline and power train components not manufactured by the BIDDER. The manufacturer's published rating shall not be raised to conform to the inherent requirements of this procurement, and

shall be at least equal to the load imposed, with adequate safety factor applied, at normal maximum operational configuration and conditions. This requirement extends to, but not limited to, the following components: engine, transmission, transfer case, drive shaft, axles, lockouts, suspension system, hydraulic system, braking system, generator, air compressor, steering mechanism and other similar components, if supplied as a part of the Contract.

Section 6: Compliance with Regulatory Requirements

If the procurement specified is a vehicle as defined by the State of Michigan Motor Vehicle Code, it is required that the vehicle as delivered complies with the Michigan Motor Vehicle Code for operation on the public highway. The successful BIDDER shall furnish the SPONSOR with a “Manufacturer’s Statement of Origin” and notarized “Bill of Sale” in conformance with the State of Michigan Motor Vehicle Code and other documents if necessary to obtain a State of Michigan Motor Vehicle Certificate of Title. It is also required that all equipment or components, whether furnished as a complete unit, an individual item, or an individual item within a complete unit, conform to all applicable Occupational Safety and Health Standards Act Regulatory Requirements and other applicable state and federal regulatory requirements.

Section 7: Compliance with Federally Assisted Contracts Regulatory Requirements

The work in this contract is included in an Airport Improvement Program Project which is being undertaken and accomplished by the SPONSOR in accordance with the terms and conditions of a grant agreement between the SPONSOR and the United States, and the Airport and Airway Improvement Act of 1982 and FAR Part 152 (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs under that Act. The United States is not a party to this contract and no reference in this contract to the Federal Aviation Administration or any representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States, by the contract, makes the United States a party to this contract.

Section 8: Non-Construction Contract, Civil Rights Act of 1964, Title VI, 49 CFR Part 21, Contractual Requirements

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1.1 Compliance with Regulations. The contractor shall comply with the Regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation (hereinafter, “DOT”) Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

1.2 Nondiscrimination. The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

1.3 Solicitations for Subcontracts, Including Procurements of Materials and Equipment. In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or suppliers shall be notified by the contractor of the contractor’s obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

1.4 Information and Reports. The contractor shall provide all information and reports requirement by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the sponsor or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

1.5 Sanctions for Noncompliance. In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:

- a. Withholding of payments to the contractor under the contract until the contractor complies, and/or
- b. Cancellation, termination, or suspension of the contract, in whole or in part.

1.6 Incorporation of Provisions. The contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Sponsor to enter into such litigation to protect the interests of the sponsor and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

Reference

49 CFR Part 21
AC 150/5100-15

Section 9: Airport and Airway Improvement Act of 1982, Section 520, General Civil Rights Provisions, 49 U.S.C. 47123

The contractor assures that it will comply with pertinent statutes, Executive orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision obligates the tenant/concessionaire/ lessee or its transferee for the period during which Federal assistance is extended to the airport a program, except where Federal assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon. In these cases the provision obligates the party or any transferee for the longer of the following periods: (1) the period during which the property is used by the airport sponsor or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits or (b) the period during which the airport sponsor or any transferee retains ownership or possession of the property. In the case of contractors, this provision binds the contractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

Reference

Airport and Airway Improvement Act of 1982, Section 520
Title 49 47123

Section 10: Access to Records and Reports, 49 CFR Part 18.36(i)

The Contractor shall maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representative's access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

Reference

49 CFR Part 18.36(i)
FAA Order 5100.38

Section 11: Rights to Inventions, 49 CFR Part 18.36(i)(8)

All rights to inventions and materials generated under this contract are subject to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed.

Reference

49 CFR Part 18.36(i)(8)
FAA Order 5100.38

Section 12: Disadvantaged Business Enterprises, 49 CFR Part 26

Contract Assurance (§26.13) – The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate.

Prompt Payment (§26.29) – The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten days from the receipt of each payment the prime contractor receives from the Sponsor or the Sponsor's Agent. The prime contractor agrees further to return retainage payments to each subcontractor within ten days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Sponsor of the Sponsor's Agent. This clause applies to both DBE and non-DBE subcontractors.

Reference

49 CFR Part 26

Section 13: Lobbying and Influencing Federal Employees, 49 CFR Part 20, Appendix A

(1) No Federal appropriated funds shall be paid, by or on behalf of the contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the making of any Federal grant and the amendment or modification of any Federal grant.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any Federal grant, the contractor shall complete and submit Standard Form-LLL, "Disclosure of Lobby Activities," in accordance with its instructions.

Reference

49 CFR Part 20, Appendix A

Section 14: Trade Restriction Clause, 49 CFR Part 30

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide written notice to the contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

Reference

49 CFR Part 30.13
FAA Order 5100.38

Section 15: Termination of Contract, 49 CFR Part 18.36(i)(2)

- a. The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.
- b. If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
- c. If the termination is due to failure to fulfill the contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
- d. If, after notice of termination for failure to fulfill contract obligations, it is determined that the contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph b. of this clause.
- e. The rights and remedies of the Sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

Reference

49 CFR Part 18.36(i)(2)
FAA Order 5100.38

Section 16: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion, 49 CFR Part 29

The bidder/offeror certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

Reference

49 CFR Part 29
FAA Order 5100.38

Section 17: Breach of Contract Terms, 49 CFR Part 18.36

Any violation or breach of terms of this contract on the part of the contractor or their subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

The duties and obligations imposed by the Contract Documents and the rights and remedies available there under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

Reference

49 CFR Part 18.36

Section 18: Energy Conservation Requirements

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

Reference

49 CFR Part 18.36

Public Law 94-163

Section 19: Clean Air and Water Pollution Control

Contractors and subcontractors agree:

- a. That any facility to be used in the performance of the contract or subcontract or to benefit from the contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
- b. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued there under;
- c. That, as a condition for the award of this contract, the contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the contract is under consideration to be listed on the EPA List of Violating Facilities;
- d. To include or cause to be included in any construction contract or subcontract which exceeds \$100,000 the aforementioned criteria and requirements.

Reference

49 CFR Part 18.36(i)(12)

Section 306 of the Clean Air Act

Section 508 of the Clean Water Act

Section 20: Buy American Preferences – 49 U.S.C. Chapter 501, Subtitle VII – Aviation Programs, Part E – Miscellaneous

The Aviation Safety and Capacity Expansion Act of 1990 is applicable to this procurement and provides that preference be given to steel and manufactured products produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products, determined by the U.S. Department of Transportation, under the Aviation Safety and Capacity Expansion Act of 1990, not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality, shall be treated as domestic.

The Secretary of Transportation may waive the obligation to appropriate funding for a project only if steel and manufactured goods used in the project are provided in the United States. If the Secretary finds that applying this obligation would be inconsistent with the public interest; the steel and goods produced in the United States are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality; when procuring equipment the cost of components and subcomponents produced in the United States is more than sixty (60) percent of the cost of all components of the equipment and final assembly of the equipment has occurred in the United States; or including domestic material will increase the cost of the overall project by more than twenty-five (25) percent. Labor costs involved in final assembly are not included in calculating the cost of components.

Use of domestic products (Prohibition against fraudulent use of “Made in America” labels): A person shall not intentionally affix a label bearing the inscription of “Made in America”, or any inscription with that meaning, to a product sold in or shipped to the United States, if that product is not a domestic product.

Purchase of American made equipment and products: It is the sense of Congress that any recipient of a Federal Grant should purchase, when available and cost-effective, American made equipment and products when expending grant monies.

Restricting contract awards because of discrimination against United States goods or services: A person or enterprise domiciled or operating under the laws of a foreign country may not make a contract or subcontract using grant monies if the government of that country unfairly maintains, in government procurement, a significant and persistent pattern of discrimination against United States goods or services that results in identifiable harm to United States businesses.

Contract preference for domestic firms: By definition a “Domestic Firm” means a business entity incorporated, and conducting business, in the United States. By definition a “Foreign Firm” means a business entity not described as a “Domestic Firm”. Subject to contract preference for domestic firms, the administrator of the Federal Aviation Administration (FAA) may make, with a domestic firm, a contract related to a grant made under competitive procedures with a foreign firm if the administrator decides, and the Secretary of Commerce and the United States trade representative concur, that the public interest requires making the contract with the domestic firm, considering United States international obligations and trade relations; the difference between the bids submitted by the foreign firm and the domestic firm is not more than six (6) percent; the final product of the domestic firm will be assembled completely in the United States; and at least fifty-one (51) percent of the final product of the domestic firm will be produced in the United States.

The successful BIDDER will be required to assure that only domestic steel and manufactured products will be used by the contractor, sub-contractors, material men and suppliers in the performance of this contract, except those:

1. That the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality;

2. That the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or
3. That inclusion of domestic material will increase that cost of the overall project contract by more than 25 percent.

BUY AMERICAN CERTIFICATE

By submitting this proposal package, except for those items listed by the BIDDER below, the BIDDER certifies that steel and each manufactured product, is produced in the United States (as defined in the above clauses A and B, Buy American-Steel and Manufactured Products for Construction Contracts) and that components of unknown origin are considered to have been produced or manufactured outside of the United States.

Should the successful BIDDER propose to use any products not produced in America, this list should be submitted to the MIDOT, Bureau of Aeronautics and Freight Services contact person within ten (10) working days after the bid opening date.

BIDDERS may obtain from the MIDOT, Bureau of Aeronautics and Freight Services a list of articles, materials, and supplies exempted from this provision.

PRODUCT	COUNTRY OF ORIGIN

If any products are submitted, the successful BIDDER should also attach a complete rationale for using products not produced in America. These materials may not be incorporated into the project until approval has been received from the Federal Aviation Administration. Failure to receive approval from the Federal Aviation Administration will not relieve the contractor from completing the job as specified at the contract unit price. The County of Muskegon is tax-exempt and does not pay sales tax.

NOTICE TO BIDDERS

LARGE DISPLACEMENT PLOW

BID OPENING OF FEBRUARY 10, 2010

1. Is the Vehicle Chassis for the Large Displacement Plow 100% American made? Yes No
2. Is the Large Displacement Plow Vehicle Chassis Final Assembly Performed in the United States? Yes No
3. Is the Front Mounted Displacement Plow System 100% American made? Yes No
4. Is the Front Mounted Displacement Plow Final Assembly Performed in the United States? Yes No
5. Is the Underbody Displacement Plow System 100% American made? Yes No
6. Is the Underbody Displacement Plow System Final Assembly Performed in the United States? Yes No
7. Is the Material Spreader and Hopper assembly 100% American made? Yes No
8. Is the Material Spreader and Hopper assembly Final Assembly Performed in the United States? Yes No
9. What is the content of American made products for the Large Displacement Plow Vehicle Chassis? _____%
10. What is the total content of American made products for the Large Displacement Plows? _____%

Remarks: (Bidder may enter explanations or expand on the above answers. Attach additional sheets as necessary.)

This section does not apply if compelling national security considerations require that it does not apply; or the trade representative decides that making the contract would violate the multilateral trade agreements or an international agreement to which the United States is a party.

Reference

49 USC Chapter 501-Buy American Preference

Section 21: Delivery

The fully assembled and operational vehicle, including all equipment and accessories shall be delivered within one hundred eighty (180) calendar days from the date of the *Notice to Proceed* to the following location:

MUSKEGON COUNTY AIRPORT
SRE FACILITY
99 SINCLAIR DRIVE
MUSKEGON, MI 49441

All arrangements for common carrier shipping shall be made by the Contractor, the cost of which shall be prepaid by the Contractor and included into the per each unit price for each vehicle as bid. The Bidder shall obtain the Sponsor's approval for the proposed shipment prior to delivery. Failure to deliver all vehicles within the specific time will be considered cause for

APPENDIX A

Prohibition of Discrimination in State Contracts

In connection with the performance of work under this contract; the contractor agrees as follows:

1. In accordance with Act No. 453, Public Acts of 1976, the contractor hereby agrees not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, or marital status. Further, in accordance with Act No. 220, Public Acts of 1976 as amended by Act No. 478, Public Acts of 1980 the contractor hereby agrees not to discriminate against an employee or applicants for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of a disability that is unrelated to the individual's ability to perform the duties of a particular job or position. A breach of the above covenants shall be regarded as a material breach of this contract.
2. The contractor hereby agrees that any and all subcontractors to this contract, whereby a portion of the work set forth in this contract is to be performed, shall contain a covenant the same as hereinbefore set forth in Section 1 of this Appendix.
3. The contractor will take affirmative action to insure that applicants for employment and employees are treated without regard to their race, color, religion, national origin, age, sex, height, weight, marital status or a disability that is unrelated to the individual's ability to perform the duties of a particular job or position, such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
4. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, age, sex, height, weight, marital status or disability that is unrelated to the individual's ability to perform the duties of a particular job or position.
5. The contractor or his collective bargaining representative will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representative of the contractor's commitments under this appendix.
6. The contractor will comply with all relevant published rules, regulations, directives, and orders of the Michigan Civil Rights Commission which may be in effect prior to the taking of bids for any individual state project.
7. The contractor will furnish and file compliance reports within such time and upon such forms as provided by the Michigan Civil Rights Commission, said forms may also elicit information as to the practices, policies, program, and employment statistics of each subcontractor as well as the contractor himself, and said contractor will permit access to his books, records, and accounts by the Michigan Civil Rights Commission, and/or its agent, for purposes of investigation to ascertain compliance with this contract and relevant with rules, regulations, and orders of the Michigan Civil Rights Commission.

8. In the event that the Civil Rights Commission finds, after a hearing held pursuant to its rules, that a contractor has not complied with the contractual obligations under this agreement, the Civil Rights Commission may, as part of its order based upon such findings, certify said findings to the Administrative Board of the State of Michigan, which Administrative Board may order the cancellation of the contract found to have been violated, and/or declare the contractor ineligible for future contracts with the state and its political and civil subdivisions, departments, and officers, and including the governing boards of institutions of higher education, until the contractor complies with said order of the Civil Rights Commission. Notice of said declaration of future ineligibility may be given to any or all of the persons with whom the contractor is declared ineligible to contract as a contracting party in future contracts. In any case before the Civil Rights Commission in which cancellation of an existing contract is a possibility, the contracting agency shall be notified of such possible remedy and shall be given the option by the Civil Rights Commission to participate in such proceedings.
9. The contract will include, or incorporate by reference, the provisions of the foregoing paragraphs (1) through (8) in every subcontract or purchase order unless exempted by the rules, regulations or orders of the Michigan Civil Rights Commission, and will provide in every subcontract or purchase order that said provisions will be binding upon each subcontractor or seller.

The Civil Rights Commission referred to is the Michigan Civil Rights Commission.

PART VI – TECHNICAL SPECIFICATIONS

Table of Contents

Section 1:	Introduction
1.1	Scope
1.2	General
Section 2:	Requirement Guidelines
2.1	General Vehicle Description
2.2	Materials
2.3	Design
2.4	Maintainability
2.5	Foolproofness
2.6	Fastening Devices
2.7	Insulation and Waterproofing
2.8	Safety Features
2.9	Visibility Requirements
2.10	Instruments and Warning Lights
2.11	Accessibility of Controls
2.12	Back Up Warning Alarm
2.13	Performance
2.14	Environmental Conditions
2.15	Mobility and Versatility
Section 3:	Chassis Component and Design
3.1	Vehicle Chassis
3.2	Vehicle Dimensions and Clearances
3.3	Frame
3.4	Load Rating
Section 4:	Engine and Components
4.1	Engine
4.2	Engine Cooling System and Winterization
4.3	Fuel System
4.4	Lubricating System
4.5	Exhaust System
Section 5:	Driveline and Controls
5.1	Transmission
5.2	Transfer Case
5.3	Axles and Suspension
5.4	Four Wheel Steering System
5.5	Braking System
5.6	Wheel and Tire Assembly
Section 6:	Operator Cab
6.1	Construction
6.2	Windows
6.3	Mirrors
6.4	Climate Control System

- 6.5 Instrumentation and Warning Lights
- 6.6 Controls
- 6.7 Radios

Section 7: Electrical System

- 7.1 System Requirements
- 7.2 Power Supply
- 7.3 Batteries
- 7.4 Starting Device
- 7.5 Lighting System
- 7.6 On-Board Diagnostics and Electronic Control System

Section 8: Accessories

- 8.1 Underbody Plow
- 8.2 Front Hitch
- 8.3 Front Reversible Plow
- 8.4 Hydraulic System and Tank
- 8.5 Stainless Steel V Box Spreader

Section 9: Miscellaneous Details

- 9.1 Treating and Painting
- 9.2 Name Plates and Instruction Plates
- 9.3 Technical Publications
- 9.4 Dynamometer

Section 10: Quality Assurance

- 10.1 Vehicle Design Principles
- 10.2 Responsibility of Contractors and Suppliers
- 10.3 Preparation and Shipment
- 10.4 Radio Interference
- 10.5 Certification
- 10.6 Instruction and Training
- 10.7 Service and Inspection
- 10.8 Warranty

Section 1: Introduction

- 1.1 **Scope:** This specification contemplates furnishing and delivering two new, unused, complete, fully operational, current production model, hi-speed, four wheel drive/all wheel drive, diesel powered, large capacity airport plows of heavy duty design and of sufficient capability to perform runway snow removal as required by the Muskegon County Airport's Snow and Ice Control Plan.
- 1.2 **General:** These specifications require all necessary items for the proper operation of the unit as a whole. All items that comprise a complete assembly may not be completely described herein. However, all units comprising the assembled vehicle or equipment shall be designed for heavy duty operation and be compatible with each other in regard to compatibility, power, strength, capability and conformance with the stipulated performance and other requirements, the same as if these items were specifically mentioned and described in these specifications.
- A. **General Provisions:** General Provisions contain certain general requirements that are, unless superseded by conflicting requirements of these technical specifications, applicable and binding to this contract.
- B. All parts and components of this unit shall be engineered and classified as HEAVY DUTY, and shall be of the size, material, and strength to sustain the maximum load limits and severe operating conditions encountered in snow removal, while resulting in minimum wear and failure.
- C. **Prototype Vehicle:** Prototype vehicles will not be accepted as complying with this specification. A prototype vehicle is defined as one that has not been developed, tested and established in production by the manufacturer without either a record of certifiable test results or supporting manuals. To be considered acceptable, the Offerer must demonstrate experience in the design and manufacture of the specified vehicle by submitting references as stipulated in the References Section of the proposal. Vendor shall provide documentation of a current model in production meeting operational standards and testing contained in FAA Advisory Circular 150/5520-20. The SPONSOR must be able to view the same current production model as bid within five (5) days after bid opening. Costs to bring the current production model to the Muskegon County Airport or to bring two airport personnel to the current production model shall be at the offerer's expense. The SPONSOR may waive any and all informalities, as it may be most advantageous to the SPONSOR, and solely reserves determination of a prototype or acceptable vehicle.

Section 2: Requirement Guidelines

- 2.1 **General Vehicle Description:** This Vehicle shall be all wheel drive and must be designed for the specific purpose of snow removal, with a minimum 51,000 GVW and approximate wheelbase of 164". It shall be designed and line built by the original manufacturer as a 4 X 4. Aftermarket conversions of 4 X 2's will not be accepted. This vehicle shall comply with all applicable FMCSR and FMVSS quality/safety standards, and requirements of the FAA Advisory Circular 150/5220-20.
- 2.2 **Materials:** Materials not specifically covered by this specification or applicable reference specifications or standards shall be of the best quality used in commercial practice for the specified vehicle fabrication. All parts and components of this unit shall be engineered and classified as "Heavy Duty", and shall be of the size, material and strength to sustain the

maximum load limits specified and the severe operating conditions encountered in snow removal, while resulting in minimum wear and failure.

- A. Dissimilar Metals: The use of dissimilar metals in contact with each other shall be avoided. Metal plating or coating of dissimilar base metals to provide suitable abutting surfaces and the use of dissimilar metals separated by suitable insulating material will be required.
- B. Protective Treatment: Materials that are subject to deterioration when exposed to weather and operational conditions normally encountered during service shall be protected against such deterioration in a manner that will in no way prevent compliance with the performance requirements of this vehicle. Protective coatings that are known to crack, chip or scale with age or extreme climatic conditions shall not be used. Rust proofing of commercial vehicles shall be accomplished in compliance with Federal Specification 297 D.
- C. Non-Metallic Material: The use of proven non-metallic materials is permitted in lieu of metal to reduce weight, lower cost or reduce maintenance and if it will not conflict with governmental requirements, degrade performance, compromise safety or increase long-term operations or maintenance costs.

2.3 **Design:** The design of the Large Plow Truck shall be in accordance with the best engineering practices to provide safe one person operation and to meet specified performance requirements. This unit shall have a fully enclosed, thermally and acoustically insulated, metal and glass cab mounted behind the engine compartment. The operator shall be in the American standard left side operating position for optimal vehicle operation. The vehicle and equipment shall be so constructed that no parts will work loose in service and all liquids, coolants and lubricants will neither spill nor leak under operational conditions. All component parts shall be new and of the latest design and highest quality. Component parts shall be of sufficient size, material, and strength as to properly sustain the maximum allowable loads imposed upon them with a maximum working efficiency and minimum wear during operation. All parts shall be built to withstand the strains, shocks, vibrations, and other detrimental conditions relative to operation, shipping and storage, with minimum time lost for maintenance, repair and servicing. The equipment design and accessory installations shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements, which might cause injury to personnel or equipment. All oil, hydraulic, and air tubing lines, and electrical wiring shall be located in protective positions, properly clipped to the frame or body structure, and shall have protective loops or grommets at each point where they pass through structural members, except where a through-frame connector is necessary.

2.4 **Maintainability:** The vehicle shall be designed to use the fewest number of different parts consistent with the specified performance:

- A. Limit the amount of special training required for an experienced mechanic to locate trouble sources, disassemble, perform maintenance, reassemble and perform routine servicing. Where practical, parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure.
- B. Permit routine operational adjustments, servicing and daily preventative maintenance by personnel wearing heavy gloves or mittens and bulky clothing with minimum disturbance to other equipment parts or components. Locking devices, controls and

fasteners, which can be easily over-torqued by operators lacking tactile sensitivity due to heavy gloves or numbness, shall not be used. Frequently serviced parts and components shall be located for convenient access unless performance shall be appreciably degraded by the accessible location. If physical or visual interference between items cannot be avoided due to functional or operational requisites, the item predicted to require the most maintenance shall be located for best accessibility.

- C. Permit maintenance with general tools and equipment normally available commercially. Use of special purpose tools and equipment shall be subject to approval by the SPONSOR. Number of tools and variety of spare parts required for maintenance shall be reduced by such design practices as reducing the variety of bolt-head sizes, light bulb sizes, wire gages, tubing and pipe sizes consistent with safety and performance requirements. Any special purpose tool required for routine servicing of the chassis and attachments or auxiliary equipment shall be provided with the bid vehicle and included in the bid price.
- D. Disconnect plugs, receptacles, junction boxes, bus bars and multiple line connectors shall be used in the electrical systems, as shall readily detachable and attachable fittings in hydraulic and pneumatic systems, as applicable, with all disconnect points clearly indicated. Pilots, guides, slides, carriages or other features shall be included where such provisions will add significantly to the ease of removal and installation or attachment of components or parts. Quick disconnect fastenings shall be used on cover plates which must be removed for part adjustment or removal.
- E. Operate when lubricated with standard commercial lubricants. Whenever practicable, lubricated for life components or components not requiring lubrication shall be used. Grease and oil seals shall be designed and located to provide accessibility for inspection, servicing and replacement. Panels that must be opened for access to lubrication points shall be hinged. Lubrication fittings shall be located in accessible, protected positions. Extended fittings shall be provided to lubricate parts or assemblies that are not readily accessible for direct lubrication or which are likely to be overlooked because of inaccessibility. All filler caps shall be attached to the filler neck with a safety chain to prevent loss.
- F. Drains, filler plugs, grease fittings, hydraulic lines, bleeders and check points shall be located so that they are readily accessible and do not require special tools for proper servicing.

2.5 **Foolproofness:** Whenever consistent with performance requirements, each major component part shall be so designed that it can be installed only in its proper operating position.

2.6 **Fastening Devices:** All screws, pins, bolts and similar parts shall be installed with adequate means to prevent loss of proper tightness and adjustment. When subject to removal, replacement or adjustment, attaching hardware for any components shall be easily removable and shall not be swaged, peened, staked or otherwise permanently deformed. Sheet metal screws shall not be used.

2.7 **Insulation and Waterproofing:** Insulation shall be fire and water resistant and of a type that will not pack or settle. Provisions shall be made to drain any water between the walls by gravity flow. All insulated areas exposed to abrasion or damage shall be protected. All components shall be so designed and protected that their normal functioning will not be impaired by heavy rain, road splash, and formation of condensation or ice and snow build up.

- 2.8 **Safety Features:** All space which is occupied or in which work is performed during operation, servicing and maintenance of the vehicle shall be free from hazardous protrusions, edges, cracks or other elements, which might cause injury to personnel. Safety features, such as steps with anti-skid tread, anti-skid deck-plates, handrails and guards shall be provided at all points where the protection of personnel is in question. Entrances and exits from the cab shall not be obstructed by component or equipment location. All rotating or reciprocating parts and all parts subject to high operation temperatures, are electrically energized, or are of such nature or so located as to be a hazard to the safety of operating and maintenance personnel, shall be insulated, enclosed or guarded.
- 2.9 **Visibility Requirements:** The design and arrangement of the cab and components shall optimize visibility for control of the vehicle for performance of snow removal operations and allow 360 degree visibility from the operator's seat. Only the material hopper and dump box attachments will be allowed to obstruct the operators view.
- 2.10 **Instruments and Warning Lights:** All instruments and warning lights required for, and consistent with, the safe, efficient operation of the vehicle shall be provided. Instruments shall be used, where practical, in lieu of warning lights. All instruments and warning lights shall be displayed in a panel or panels, located below eye level, in such a way that they will be most useful, convenient and visible to the driver. The panel(s) shall either be hinged for back access or removable by the use of quick disconnect fittings for all electrical, air and hydraulic circuits. All instruments and controls shall be illuminated, with backlighting to be used where practical.
- 2.11 **Accessibility of Controls:** The cab shall have all the necessary controls within easy reach of the driver for the full operation of the vehicle, including components. Operation of all radios specified by the purchaser shall be from inside the cab and shall be mounted to permit quick servicing or replacement, together with ease of operation by the driver.
- 2.12 **Back Up Warning Alarm:** An electronic back up audible warning device meeting current safety standards is required. This device shall be activated automatically when the transmission is shifted into reverse.
- 2.13 **Performance:** The vehicle shall be powered by a diesel engine capable of developing sufficient power under operating conditions to achieve the required performance characteristics in accordance with these specifications.
- 2.14 **Environmental Conditions:** The vehicle shall be capable of withstanding, without detrimental effect to subsequent operation, ambient temperature ranging from -40 degrees to 100 degrees Fahrenheit, and relative humidity up to 100 percent, as well as driven snow, sleet or rain. A full winterization system is required, to provide operation at -40 degrees Fahrenheit without damage due to freeze up.
- 2.15 **Mobility and Versatility:** The fully loaded and equipped vehicles shall be capable of meeting the following requirements in daily operation:
- A. Fully equipped intermediate plow units, loaded to GVW and with front plow in transport position, will be capable of maintaining a continuous forward speed of not less than 45 miles per hour, on dry level pavement, and negotiating a four (4) percent grade at 40 miles per hour, without loss of power.

- B. Units shall have a demonstrable capacity of displacing 1 inch of snow (density of 25 pounds per cubic foot) with the front mounted plow at speeds of 10 to 40 MPH.
- C. Units shall start and perform normal operations at an ambient temperature of -40 degrees F and shall be capable of dry sweeping performance at 100 degrees F.
- D. Units shall be minimum 51,000 lbs gross vehicle weight (GVW) capable of being outfitted with underbody plows, dump box (or flat bed) and material spreader with 5 CYD capacity hopper. The entire snow handling assembly, including, but not limited to plows, material spreader and dump box shall be equipped so as to allow full control of all normal operating functions and monitoring of essential parameters by a single operator using minimum controls from the cab of the vehicle.

Section 3: Chassis Component and Design

Vehicle Chassis: The vehicle chassis, complete with cab, shall be a current production model of the manufacturer. Parts and accessories necessary for the safe operation of the vehicle shall be provided as required by, and shall conform to, federal, state and local regulations that may be applicable to this type of vehicle at the time of its manufacture. The rating of the chassis shall equal or exceed the actual gross weight at the time of its manufacture. The rating of the chassis shall equal or exceed the actual gross weight of the fully equipped vehicle.

The chassis shall be designed to permit easy and safe mounting and dismounting of the unit for the operators and service personnel. All sheet metal, cowling, steps and fenders shall be free of sharp edges and protrusions. All steps or walkways shall be raised lug or expanded metal type construction. Grab bars shall be installed as required for safe mounting and dismounting by personnel. All sheet metal for cowling, shrouds and fenders shall include ample supports and bracing to prevent distortion and cracking. The engine shall be enclosed in a housing of weatherproof design, full butterfly side opening for access to each side of engine, stationary grill design. Front tires shall be equipped with fenders. Rear tires shall have mud flaps.

The carrier engine access cover shall be a fiberglass (or steel) tilting type with an air over hydraulic assist system installed on the vehicle. Hoist shall operate on system air pressure by means of push to operate controls. Hood lift shall include a minimum of two (2) hydraulic cylinders to avoid deformation of engine cover, one on left and one on right, mounted under the hood for cosmetic reasons, or nitrogen charged shocks to assist in one man lifting of the hood. Lowering shall be accomplished by means of an orifice release to provide a slow and safe lowering of the hood. Two guides shall be mounted below the leading edge of the hood one left and one right, to self align hood as it lowers. Rollers or other appendages on the hood shall lower to the outside of these guides. A comprehensive lubrication data plate shall be affixed to the rear engine cover easily visible from the ground.

3.1 Vehicle Dimensions and Clearances:

- Overall Width: The maximum overall width of the vehicle, without attachments shall not exceed 108 inches.
- Wheelbase: The wheelbase shall not exceed 180 inches.

- Cab to rear axle distance: The distance from the rear outside wall of the cab to the center of the rear axle shall be between 90 and 108 inches.
- Overall Length: The maximum length of the vehicle without attachments shall not exceed 25 feet.
- Overall Height: The overall static height, excluding lights, antennas and exhaust stacks shall not exceed 144 inches.
- Ground Clearance: Minimum bottom of frame to ground clearance shall be 24 inches.
- Vehicle Turning Radius: Vehicle turning radius shall not exceed 40 feet.

3.2 **Frame:**

- The frame shall be of Grade 8 bolted construction, with heat treated, 120,000 psi yield, straight single channel carbon manganese steel rails, connected by an adequate number of cross members to resist frame distortion from the lateral stress expected in this application.
- Minimum bar size shall be 12.375" X 3.875" X .375", with minimum 2,818,000 inch pound RBM per rail.
- Frame shall be industry standard 34" width.
- Two (2) tow hooks shall be mounted on both the front and rear of the vehicle.
- A minimum 24" integral front extension is required. Sufficient length shall be present from the rear drive axle to the end of the frame to provide area for dump body installation. FRAME LINERS, WRAPPERS, FISHPLATING, AND BOLT-ON EXTENSIONS ARE NOT ACCEPTABLE.
- A pintle hitch shall be installed at the rear with minimum 49,000-pound towing capacity.
- Outside of frame rails above the front driving axle and below the fender shall be clean and free of mounted equipment that may be damaged by snow, ice, sand, or material buildup. This specifically includes, but is not limited to, fuel filter, fuel/water separator, oil coolers, coolant filters, coolant hoses, oil lines, and other such sensitive systems.

- 3.3 **Load Rating:** The functional load rating of the frame shall equal or exceed the actual gross vehicle weight (GVW). The gross vehicle weight rating, including complete chassis, cab with attachments, accessories, and equipment; including a full complement of fuel, lubricant, and coolant; a 430-pound allowance for operating personnel and a full dump box or material hopper shall be a minimum of 51,000 lbs. The frame shall not be altered in any manner that will reduce its load rating. The gross vehicle weight rating shall not exceed the sum of the axle ratings used. The manufacturer's advertised gross vehicle weight rating shall not be arbitrarily raised to meet the requirements of this specification.

Section 4: Engine and Components

4.1 **Engine:**

- Engine shall be an internal combustion, four cycle, six cylinder diesel engine with a horsepower range between 450 and 470 Hp.
- Engine shall operate on commercial grade fuel
- Electronic control diesel engine management system including key operated integral engine shutdown and management system.
- Engine shall have an automatic power derate system to protect against low oil pressure or high water temperature.

- Engine shall be provided with full flow, replaceable oil filters, dry type two stage air cleaner with selectable air intake, fuel filter, and emergency warning system with light and buzzer, in event of high water temperature and/or low oil pressure, and front engine PTO flange for mounting a front mounted hydraulic pump to be driven directly off the crankshaft.
- Engine emissions to met Federal 2010 standards
- 12 volt starting motor with gear reduction and thermal over-crank protection
- Cold weather starting aid and engine preheating devices
- 120 volt/1250 watt block heater socket receptacle type; mounted below left (driver's) door including Y cord from standard socket location with provision in oil pan for installation of oil pan heater for extended life coated oil pan
- Electric grid heater for intake manifold with engine ECM control
- PTO engine front shall include adaptor plate mounted on front of engine
- Single element air cleaner, with integral snow valve and in-cab control
- Air cleaner restriction gauge mounted on air cleaner
- Wet type cylinder sleeves
- Electronic control engine management system including key operated integral engine shutdown system
- Two speed direct drive fan with residual torque device for disengaged fan speed, fan nylon, fan optimized position
- Provision for setting high idle in the cab
- Electronic cruise control with steering mounted operator controls
- Magnetic system plugs

4.2 **Engine Cooling System and Winterization:**

- The engine's cooling system shall be of the liquid type
- The cooling system shall consist of a HEAVY DUTY vertical flow radiator, with the top & bottom tanks, and side members bolted together to form a rigid frame.
- Tanks shall be steel and the core shall be constructed of copper and brass.
- Transmission cooler shall be located in the bottom tank.
- Thermostatically controlled, air operated disconnect type suction fan shall be provided.
- Engine cooling system shall be filled with extended life coolant for operation in -40° F (-40° C) ambient temperature minimum.
- Coolant temperature control of the engine shall be consistent with the engine manufacturer's recommendation when operating under the intended service and conditions, without overheating.
- The engine(s) cooling system shall be certified as suitable for use in this vehicle by the engine manufacturer.
- Premium rubber radiator hoses
- Hose clamps shall be thermoplastic coolant hose clamps

4.3 **Fuel System:** The fuel system shall include, but not be limited to, injector, fuel pumps, fuel filter, fuel pre-filter, piping, valves, fittings, fuel lines and all other necessary accessories to make a complete system. The fuel system shall be equipped with:

- 50 gallon steel fuel tank with filler pipe opening in an accessible exterior location on side of the vehicle
- A 4" diameter filler neck shall be provided with twist style chain connected tank cap.
- If climbing is required to fill the fuel tank, steps and a platform for the operator to stand on while fueling, is required
- Fuel filter to include fuel/water separator

- Fuel filter and fuel/water separator shall be in a single assembly and include water-in-fuel sensor
- The fuel tank(s) shall be mounted so that they will not be damaged by distortion of the chassis and will not be affected by heat from the engine or exhaust.

4.4 **Lubricating System:** The engine, transmission and chassis lubricating systems shall be the manufacturer's current standard type conforming to the following:

- Pressure system lubrication with full-flow filter including spin-on replacement element
- Oil pressure and coolant temperature gauges
- Low oil pressure power de-rate or emergency shutdown system
- The transmission shall operate efficiently and without detrimental affect to any components when lubricated with standard commercially available lubricants in accordance with recommendations of the transmission manufacturer.
- All moving parts requiring lubrication shall have means provided for such lubrication. Where the use of high lubricating pressure may damage grease seals or other parts, a suitable pressure release device will be provided.
- Pressure lubrication fittings shall not be provided where normal use would damage grease seals or other parts. Prior to delivery, the vehicle shall be serviced with lubricants and hydraulic fluids suitable for use in the temperature ranges where the vehicle is to be placed in service.
- Hoses shall be installed on oil pans to assist in changing oil if a straight drop is not provided.

4.5 **Exhaust System:** The vehicle shall be equipped with an exhaust system that complies with the 2010 federal emissions standards. In addition, the exhaust system shall comply with the following:

- The tail pipe shall be extended to a height at or above the roof of the cab and be of such a size as to prevent backpressure in excess of that recommended by the engine manufacturer.
- The tail pipe shall be so located as to prevent entrance of exhaust gases into the cab under all conditions of operation.
- The exhaust exit design shall also avoid the recirculation of exhaust gases into the engine air intakes.
- The muffler shall be aluminized stainless steel or ceramic coated with a stainless steel exhaust guard covering the vertical muffler as a matter of safety to protect personnel from burns.
- Exhaust system shall be designed and manufactured to prevent rain or slush from entering the tail pipe.

4.6 **Filters:** One (1) extra set of filters for all engine, cooling, lubrication and exhaust systems shall be provided.

Section 5: Driveline and Controls

5.1 **Transmission:** The transmission shall be a continuous four wheel drive, automatic drive system with a minimum of 5 speeds with a low gear ratio of 3.51:1 and an appropriate torque converter for this application. Transmission shall also include the following:

- Transmission shall be Allison 4000 RDS or equal
- All transmission parts and accessories shall be manufactured by, supplied by or certified for use with transmission by transmission manufacturer

- Transmission fluid/oil level sensor
- Transmission shall be matched to the operating characteristics of the engine and shall have suitable load ranges to accommodate expected operating conditions.
- Transmission control shall include a range selector lever or push button control with reverse, neutral and forward positions all clearly identified.
- The transmission manufacturer shall certify the continuous drive transmission as suitable for use in this vehicle.
- A dedicated back up connection shall be provided between the shifter and vehicle electronic system to allow the operator to shift into gear during fault mode or if the main data bus fails.
- Automatic transmission cooler suitable for and compatible with transmission without modifications to the transmission

5.2 **Transfer Case:** The transfer case shall be a two-speed type with an automatic locking type differential that automatically proportions torque to the front and rear axles to meet the specified performance requirements while compensating for difference in travel between front and rear wheels without driver intervention. The hi-low range selection shall be electric over air actuated and operated from the cab and equipped with Smart Shift® (or equal) to eliminate range shifting at excessive speeds. The transfer case shall include the following:

- The transfer case shall have a torque transmission capacity exceeding the maximum torque developed by the engine and transmission, and shall be approved for the application and be manufactured by the chassis builder.
- Tapered roller bearings are required to support the shafts within the case. Upper shaft and bearings shall be pressure lubricated by means of a lubrication pump driven by the top shaft of the transfer case.
- Pump shall be external to the case to facilitate maintenance throughout the life of the vehicle.
- All wheel drive indicator light on instrument panel. Indicator light to be on when all wheel drive is engaged.

5.3 **Axles and Suspension:** The axles furnished shall be certified as being suitable for use in this vehicle by the axle manufacturer, and designed for specified tire mounting. Axle manufacturer's published rating shall not be raised to conform to the requirements of this specification and shall be at least equal to the load imposed at ground level when the vehicle is loaded to its gross vehicle weight.

- Steering-drive wheel ends shall be bolted to and removable from the center section of the axle housing.
- Cardan drive type joints shall be totally enclosed within a sealed ball and socket to protect the moving parts of the axle and steering joints from dirt and slush.
- Trunnion pins shall be supported by pre-loaded tapered roller bearings to insure long life and smooth steering at all cramp angles.
- Spring hangers, pins, and supports shall be heavy duty to insure long life.
- Pins shall be of the grease type with substantial bronze bushings

5.3.1 **Front**

- The front axle shall be drive/steer type, and of the full floating, torsion flow type with a single reduction spiral bevel gear design
- Minimum 25,000 pound GVW hub and brake rating
- Minimum 10" ground clearance
- Capable of withstanding the loads of the unit being bid

- Front axle driver controlled differential shall be of the type to prevent potential damage while turning the steering axle when locked
- Magnetic drain plug for axle
- Suspension shall include alloy steel springs of the semi-elliptical type, 25,000-pound minimum rating

5.3.2 **Rear**

- The rear driving axle shall be of the full floating, torsion flow type with a single reduction spiral bevel gear design
- Minimum 26,000 pound GVW hub and brake rating
- Minimum 10" ground clearance
- Capable of withstanding the loads of the unit being bid
- Driver controlled locking differential
- Magnetic drain plug for axle
- Suspension shall include alloy steel springs of the semi-elliptical type, 26,000-pound minimum rating on the rear axle

5.4 **Four Wheel Steering System:** Front axle steering shall be Sheppard integral hydraulic power assist gear type (or equal). The steering gear shall be rated for heavy duty service. Four wheel steering shall be electronically coordinated through the standard steering wheel. A selector switch within easy reach of the operator shall provide the option of front steer only, crab steer, or coordinated front/rear steer. Additionally, a single axis joystick shall be provided for controlling rear steer only.

The system shall include safety provisions for dampening of all wheel steer effects at higher speeds, but it shall also allow full operation while the vehicle is moving at lower speeds. An indicator shall be provided in the cab to display mode selected and rear wheel position. Also for safety, there shall be a mechanical linkage maintained at all times between the steering wheel in the cab and the front axle to assure the ability to control the vehicle in the event of hydraulic or electrical system failure. Safety dampening of all wheel steer effects shall be related to vehicle speed and all wheel steer be available in both transfer case speed ranges.

Due to the conditions under which the vehicle will be operated the ability of this equipment to operate safely at all speeds while maximizing maneuverability, and provide the operator the ability to select the desired mode of operation "on the go" an electronically controlled rear axle steering system which operates in conjunction with the mechanically controlled front wheel steering system is required. This system must consist of the following components and operating features.

The all wheel steering system consists of the following major components:

- The Vehicles original front steering system
- A driving, steerable rear axle
- Various hydraulic control valves, wheel position sensors, speed sensor and a steering cylinder located on the rear axle
- ECU (electronic control unit) and control panel (located in the cab)
- All of the all wheel steering system controls are to be located in the cab easily accessible to the operator.
- The all wheel steering system must be preprogrammed with multiple steering modes for improved maneuverability.
- The driver must have the option to select one of the following modes of operation "on the go" based on the driving conditions at hand.

- 5.4.1 **Front Steer.** When in the front mode the vehicle behaves like a conventionally steered vehicle. In this mode, the axle lock remains in the locked position and the rear axle does not steer. Use this mode when enhanced maneuverability is not needed or during operation at speeds greater than 30 mph, such as highway travel or straight ahead high speed plowing operations.
- 5.4.2 **Coordinated Steer.** This mode gives the operator the tightest turning radius of any of the available modes. When the front axle is steered, the rear axle turns in the opposite direction of the front, which reduces the turning radius and enhances maneuverability. This mode also has a deadband feature. Deadband allows the vehicle front axle to be turned a predetermined number of degrees in either direction before the rear axle steers. The deadband varies according to the speed of the vehicle. The rear axle lock remains engaged (locked) when the front axle is within the deadband range. The diameter of the turning radius measured at the front axle tire can not exceed 249 inches.
- 5.4.3 **Crab Steer.** When the front axle is steered, the rear axle steers in the same direction as the front axle. This makes the vehicle travel in a diagonal motion, sometimes called “crab walking”. This mode can be useful for parallel parking or for counteracting side forces applied to a vehicle, such as during low speed snow plowing operations. This mode also has a speed controlled variable deadband.
- 5.4.4 **Joystick or Manual Rear Steer.** When in this mode, the rear axle is controlled only by the joystick, independently of the front wheel position. Use this mode only during low speed operation. This mode is particularly useful when backing the vehicle or when the vehicle is plowing large amounts of snow and more plow angle is desired. The hydraulic locks remain operational; however, the mechanical lock is disengaged (unlocked) at all times when in this mode.
- 5.4.5 **Switching Between Modes.** The mode switch may be moved at any time; however, the ECU will not switch modes unless the front axle crosses center. If the front axle does not cross center the system remains in the previous mode until the front axle crosses center. The rear wheels must be in the straight-ahead position before the mode change occurs.
- 5.4.6 **Rear Wheel Position Gauge.** The system must include a rear wheel position gauge which performs the following three functions:
- *Calibration Indicator:* The LED bar graph on the display gauge is used for calibrating the wheel position sensors. The LED bar graph display shows the position of the angle sensors for adjustment purposes.
 - *Rear Wheel Position Indicator:* The LED (light emitting diode) bar graph display shows the operator the position of the rear wheels. When the rear wheels are in the straight-ahead position, the center green LED will be on. When the rear wheels are turning left, the LED bar graph sweeps from center to the left in proportion to the rear wheel angle. When the rear wheels are turning right, the LED bar graph shall sweep from center to the right, in proportion to the rear wheel angle.
 - *Error Code Display:* The error code display is used in troubleshooting. If an error is detected by the ECU (electronic control unit), it signals the operator. This display is also used during system start-up to display the current CPU (central processing unit) software revision level.
- 5.4.7 **Mode Lights.** The mode light feature consists of four lights:

- The FRONT mode light is lit when the all wheel steering ECU is operating in the front steer mode and the three position mode switch is in the front steer (center) position.
- The AXLE LOCKED mode light is lit when the rear axle is mechanically locked in the straight-ahead position. This light also comes on when the all wheel steering ECU detects a system problem and an error code is displayed on the rear wheel position gauge:
- The COORD mode light is lit when the all wheel steering mode switch is in the coordinated steer mode position and the ECU is operating in coordinated steer mode.
- The CRAB/JOYSTICK mode light is lit when the three position mode switch is in the rear steer position and the ECU is operating in the rear steer mode.

5.4.8 **Managers Switch.** A key switch must be provided which will allow supervisory personnel to “lockout” or “enable” operation of the all wheel steer system. This switch is included to insure that only those operators who are qualified to operate the vehicle all wheel steering system are permitted to do so

5.5 **Braking System:** An electronic anti-lock braking system (ABS) that meets the applicable FHWA requirements for similar type vehicles shall be furnished complete with all necessary equipment to safely control the fully equipped and loaded or unloaded vehicle under all operating conditions. Brakes shall, at a minimum, include the following

- Service brakes shall be fully air actuated, drum and shoe type with a minimum 15 CFM capacity air compressor
- Service brakes shall have documented as to conform to FMVSS 121 including a 4-sensor, 4-modulator ABS system.
- Parking brakes shall be spring actuated, air released at the rear service brake chambers, with the air switch mounted in easy reach of the operator.
- Both front and rear brakes shall be s-cam type.
- Air system shall be equipped with a heated Bendix AD-IS (or equal) air drier system

5.6 **Wheel and Tire Assembly:** The vehicle shall be supplied with front and rear wheels. This unit shall be equipped with proper sized wheels and tires for the GVWR rating of the unit being bid, in compliance with National Wheel and Rim Association standards. Rim shall conform to the hub for proper weight distribution and even tire wear.

- Single Michelin XZL 16.00R20 or approved equal tires are required on all axles
- The wheels shall be of the steel disc type with a 11.25" bolt circle
- One spare wheel and tire assembly shall be supplied.
- Front/Rear wheels to be painted black.

Section 6: Operator Cab

6.1 **Construction:** The cab shall be a HEAVY DUTY two man type, all steel, galvanized exterior with a waterproof cab roof and include the following:

- 3-point rubber mounted, 72" wide minimum, fully insulated, one-piece reverse slope windshield
- Power windows left and right doors
- Curb visibility window in right hand door
- full width rear windows
- Piano type door hinges with stainless steel hinge pins the full height of the door is required to provide solid door mounts for the life of the vehicle.

- Complete rust proofing on all inside metal surfaces less than 3/16" thick.
- Floor mat, rubber or vinyl covering complete cab floor, fastened for easy removal, but securely held to floor.
- Tilt/Telescoping steering wheel
- Bostrom Sierra Air 400RX (or equal) driver and passenger seats with retractable seat belts
- Heated West Coast type mirrors
- Dual sun visors
- Left and right outside grab handles
- Cab mounted electric & air horns
- One fire extinguisher, ABC dry chemical, 20 lb. minimum shall be mounted inside the cab.
- The cab shall have a rated decibel level conforming to current regulations.
- Engine shall not intrude into the cab envelope (no doghouse).

6.2 **Windows:** Windows shall be tinted DOT approved safety type glass. The windshield shall be equipped with dual electrically operated variable speed windshield wipers with intermittent feature. Electrically operated windshield washers shall be provided and installed. The windshield and rear window shall be heated, electrically powered by a dedicated alternator or by the vehicle's heating and air conditioning system. Side cab windows, one on each side of cab, shall have defrosters and electric window wipers. Rear window shall be of the stationary type. Cab doors shall be equipped with side window wipers with heated type blades. Cab doors will feature an all glass design to provide the operator with maximum possible visibility.

6.3 **Mirrors:** Two heated outside rear view mirrors having an area of not less than 60 square inches each shall be provided as well as a wide-angle convex mirror on each side with a minimum area of seven square inches. Mirrors shall be breakaway type and controlled or adjusted electrically by remote control.

6.4 **Climate Control System:** A fresh air climate control system with selectable functions shall be provided. The climate control system shall be capable of 50,000 BTU minimum and supply warmed or cooled air to maintain a cab temperature of 65° F at ambient temperatures of -20° F to +90° F. The system shall contain a fresh air filter, recirculating vent and snow-free fresh air intake and approval anti-fog system. Defroster ducts shall be provided to the windshield and side windows. Two ceiling mounted window fans shall be supplied to assist in air movement.

6.5 **Instrumentation and Warning Lights:** The cab shall be provided with an instrument panel or pedestal equipped with instruments and controls in full view of and for convenient operation by the operator. All instruments and controls shall be below eye level and shall be labeled in a manner to remain legible for the life of the carrier, to indicate function and be illuminated for night operation. All instruments, controls, and lights necessary for proper operation of the plows and material spreader system shall be provided, grouped as closely together as practical for each engine, and shall, as a minimum, include the following:

- Molded plastic instrument panel trim with black center section
- Electronic speedometer with recording odometer (English language)
- Gauge cluster shall include engine oil pressure (electronic), transmission oil temperature, water temperature (electronic), electronic fuel gauge, electronic engine tachometer with hour meter, voltmeter and washer fluid level.

- Warning system to include low fuel, low oil pressure, high engine coolant temperature and low battery voltage
- Low air pressure warning, visual and audible alarm
- Transmission oil temperature gauge, with overheat warning icon
- Differential lock indicator or Traction Lock engaged icon
- Engine air cleaner restriction indicator
- Doom light with door activated and push on/off control and dimming integral to center console
- ABS Fail Warning icon
- Parking Brake applied icon
- Message center for fault messages

6.6 **Controls:** The following cab mounted controls shall be provided as applicable with illumination of controls by backlighting or flood lighting as required:

- Accelerator pedal
- Chassis mounted headlight switch
- Brake pedal
- Parking brake control
- A tilt/telescoping steering and warning light column with self-canceling turn signal and horn activator
- Four-way emergency flasher
- Transmission selection lever or push button shifter
- Flashing beacon switch (one switch shall activate all light bars)
- Ignition switch(s)
- Cab-mounted headlight/taillight switches
- Variable speed windshield wiper(s) and washer controls
- Heater/defroster, fresh air type with 3 speed (minimum) fan motor
- Master electrical disconnect switch
- Heated mirrors switch
- Cab dome light switch
- Two (2) 12 volt power outlets

6.7 **Radios:** Suppression of the electrical system, sufficient to assure positive operation of all radio equipment shall be furnished. All computerized components must be appropriately shielded to eliminate any potential interference from using two-way radio equipment from inside the vehicle. The following radio shall be supplied and mounted securely in the cab of the vehicle:

ICOM IC-A110 VHF Air Band Transceiver, including microphone and exterior (cab roof) mounted antenna.

All radios shall be installed, with location approved by the Sponsor, and include antennas and microphones and all appurtenances to complete the installation, ready for operation.

Section 7: Electrical System

7.1 **System Requirements:** The electrical system and devices shall be installed in accordance with the best modern practices for the type of service required. The alternator and starting device shall be of a waterproof type, accessibly mounted and protected against excessive

heat. All electrical circuit wiring shall be made with stranded conductors of a carrying capacity commensurable with the anticipated maximum circuit loading, with insulation in accordance with the recommended standards of the Society of Automotive Engineers for such loading at the capacity and location employed. Overall covering of conductors shall be of a weatherproof type. All connections shall be made with lugs or terminals mechanically secured to the conductors. Wiring shall be thoroughly secured in place and suitably protected against heat, oil, and physical injury. Circuits shall be provided with suitable overload protective devices. Such devices shall be readily accessible and protected against excessive heat, physical injury and water spray. Standardized quick disconnect plugs shall be provided throughout for ease of maintenance in removing components or in the event of system damage. Automatic reset circuit breakers on all major circuits are required (fuses are not acceptable). Additional factory installed circuit breaker protected in-cab switches for after market auxiliary lighting shall be provided. Integral wiring for all cab-mounted and other lighting equipment, heavy duty rocker type light switches, positioned, labeled and illuminated for easy driver identification and use. Standard lighting shall meet FMVSS requirements. A Hobbs hourmeter shall be located in the cab.

7.2 **Power Supply:** The vehicle shall be provided with a 12 volt DC electrical system for lighting and a 12 volt DC starting system.

- Pad mounted, 12 volt brushless type alternator with minimum 160 amp capacity
- Remote voltage sensor
- Pad mounted with gear, dual belt or serpentine belt driven.

7.3 **Batteries:**

- Minimum three (3) maintenance free 12 volt 1950 CCA threaded stud batteries
- Minimum 2100 cold cranking amps at 0° F (- 18° C)
- Battery box to be frame mounted
- Jump start stud located on battery box

7.4 **Starting Device:** An electrical starting device shall be provided. When operating under maximum load, its current draw will not introduce a voltage drop, which may adversely affect the function of other electrical equipment required during the start up process. An engine coolant preheating device shall be provided as an aid to rapid starting and high initial engine performance.

7.5 **Lighting System:** The lighting system, including reflectors and clearance lights, shall be the manufacturer's current standard provided the equipment shall meet the applicable state and federal safety regulations. The system shall include, but not be limited to, the following:

- Two High Intensity Discharge (HID) cab roof-mounted headlights shining toward the front of the vehicle with three-way switch to select upper or lower headlights
- Dual tail, stop and clearance lights
- Self-cancelling turn signals, front and rear, with a visual indicator
- Two back up lights installed at the rear of the vehicle. Lights shall automatically light up when transmission is shifted into reverse.
- Whelen 800 Amber strobe beacons, or an approved equal, mounted on or near the top of the cab, visible 360 degrees in the horizontal plane, with a single dash mounted switch to activate
- Two halogen chassis-mounted headlights in front of the vehicle with three-way switch to select upper or lower headlights

- A sealed beam spotlight or remote controlled spot light on both the left and right sides of the cab roof or windshield, operator adjustable type from inside the truck cab, similar to NP 130 NightProbe, as manufactured by Code 3, Inc. (www.code3psi.com), or an approved equal.
- Cab dome light(s)
- Variable intensity instrument lighting
- A master electrical disconnect switch located within easy reach of the operator
- Multi-purpose type work lights mounted under engine hoods (2 required minimum)
- Two extra circuit breakers for owner installed equipment
- One halogen headlight mounted on each side of the vehicle as high as practical

Section 8: Accessories

- 8.1 **Underbody Plow:** These specifications are intended to describe a power reversible 3-function underbody plow which shall be built from new materials, and suited for continuous work under conditions imposed by airport snow removal operations and year round use, capable of handling snow pack, ice and a higher volume of snow at various speeds in the winter season and be able to do gravel access road and safety area maintenance throughout the year. At a minimum, the underbody plow shall include the following:
- Moldboard shall be a minimum 1" thick and 20" in height, heat treated carbon steel with carbide tip.
 - Cutting edge shall be a serrated blade specifically designed for ice removal
 - Two plow blades shall be supplied. One shall be attached and the other an unattached spare.
 - Reversing table shall be a 1" solid one-piece circle with infinite plowing positions available up to 45°
 - Reversing will be accomplished with two 4" double acting cylinders
 - Cylinders will provide a hydraulic lock for holding the moldboard in place while in use
 - A 30 gpm gross over relief valve shall be furnished.
 - Circle shall include a hardened, welded in bushing to prevent center pin wear on the circle.
 - Cylinder rods shall be a 2" diameter with a hard nitrated finish
 - Cylinders shall be mounted with 2" pivot pins
 - Reversing circle shall pivot around a 5" center pin and be attached with three ¾" mounting bolts to prevent hold elongation and lubricated with grease zerk.
 - Center pin shall include a machined grease groove for lubricating the entire circumference of the center bolt
 - Circle hold down blocks shall be a 20.5" long by 7" deep and bolted to the hanger board as close to the circle as possible for maximum strength.
 - The shape of the hold down blocks shall match the shape of the circle
 - Install a piece of 3/8" UHMW underneath the hold down blocks to act as a wear plate for ease of movement of the circle
 - Hanger brackets shall be one piece, solid, ¾" x 18" x 26", A36 mild steel
 - An 8" x 12" bar grating step shall be installed on the left front corner of the moldboard to assist operator entry to the cab.
 - Hanger board shall be designated and engineered for optimum strength and durability
 - Hanger board shall be manufactured from ½" formed plate, reinforced by ½" x 7 ½" flat plate and 2-piece ¾" x 2" bar on edge
 - Hinge line shall be a solid shaft, 96" in length and have three moldboard anchor points.

- Cold rolled, 1018 steel, with two outer hinges being 3 ¼” O.D. by 6” length, with center hinge being 3 ¼” O.D. by 10 ¾” in length, , with a 0.344 wall thickness mechanical tubing
- Hinges shall be reinforced with one wrap around ½” gusset on the outer two hinges and two gussets on the inner hinge
- Three heavy duty hinges shall be located to minimize stress along the hanger board for maximum strength
- Hinge shaft and hinge tube shall include four grease zerks
- Inner hinge shall have two wear plates to prevent side to side shifting of the moldboard
- Moldboard actuation will be accomplished by two 3 ½” double acting cylinders with 2” hard nitrated plated piston rods
- Canister cylinder assembly shall be retained by a 4-bolt flange assembly
- Cylinders shall be mounted in shock housings that are trunnion mounted with a ¾” thick reinforced steel trunnion brackets
- Trunnion bearings shall be 2 ¾” by 0.344 wall thickness carbon steel and shall be lubricated with two grease zerks per cylinder at the trunnion mounts
- A grease zerk shall be located at each cylinder head
- Cushioning of the mold board will be with two heavy duty shock assemblies with two internally mounted 586#/inch 0.8125” wire, AISI 5161 steel springs
- Pressure relief valve shall be preset at 400 PSI and be provided with the underbody plow
- Hydraulic steel tubing shall be externally mounted for ease of maintenance in poly mounted block assemblies
- All hardware and fasteners shall be electronically plated and corrosion resistant
- Underbody plow components shall be shot blasted, chemically treated, and powder coated prior to assembly.
- Mold board stops shall be installed so that the moldboard discharge will be outside of the drive tires on each side
- Additional stops shall be installed on the bottom of the circle to protect the transmission in the event of center bolt failure

8.2 **Front Hitch**

- The front attachment hitch between the plow and chassis shall be a DIN plate type quick hitch. It shall allow easy interchange of the plow and other attachments. It shall be hydraulically operated (plow lift and swing) and designed for power reversible runway plows. The plow moldboard, push frame, swing, and lift must be capable of being completely removed and reattached to the chassis as a unit. The entire process of hitching or unhitching shall be possible by one man in not more than 10 minutes and shall be positively connected. All hydraulics and structure for plow lift, swing, oscillation, and lock shall be on the plow side of the DIN plate coupling.
- A DIN plate style coupler shall be attached to the chassis front frame rails. It shall consist of two side (cheek) plates of adequate size bolted to the chassis frame rails with a welded 0.63-inch thick push plate perpendicular to the truck frame rails. This flat mounting push plate shall have two (2) top mounting pockets to accept the mating portion of the plow or other possible front attachments that are equipped with a similar standard DIN type hitch.
- The plow shall be mounted and unmounted from the chassis by means of a mating DIN plate hitch of a size sufficient to support the weight and operation of the plow. It shall allow easy interchange of the plow and other attachments. Two (2) steel claws and slots for two (2) 1-inch diameter swing bolts with nuts that are part of the attachment will lock the connection between the attachment and chassis. All hydraulic lines from the

chassis to the plow side of the hitch shall be of quick disconnect type and clearly marked for ease of change.

- The moldboard, push frame, frame, and plow side of the hitch once detached, will rest on the ground on the caster tires and the cutting edge stands
- The plow lift system of the hitch shall be a parallel lifting type consisting of two (2) parallel tubular lift arms made from 3 inch x 3 inch x 0.31 inch wall steel tubing. The design shall incorporate a dual acting plow lift cylinder. The dual acting plow lift cylinder shall be 4 inch bore 15.75 inch stroke with a 2 inch diameter rod, minimum. This lift cylinder will also serve to remove and attach the plow. The plow lift hydraulic system will be furnished with a relief valve to prevent down pressure in excess of 200 psi. The lifting cylinder arrangement shall incorporate a mechanical transport lock that shall take the weight of the plow off the hydraulic cylinder during plow transport, and shall act as a safety in the event of a hose failure during transport
- The plow swing system shall consist of two (2) telescoping type hydraulic cylinders able to position the plow to angle left, right or straight ahead. To maximize snow removal production, a wide plowed path is desired. Therefore, maximum angle to the left or right shall be 32 degrees. Pusher vehicle shall have adequate horsepower and durability to work with plow at this shallow angle. The telescopic hydraulic cylinders shall be two-stage type with an outside diameter of 4.50 inch and chrome plated rods with a minimum diameter of 2.50 inches. The cylinders shall be 19.50 inch long from center of mounting hole to center of mounting hole when retracted and shall have a stroke of 20.25 inches. The cylinders shall be heavy duty to allow for heavy snow plowing under severe conditions and shall be equipped with a double acting hydraulic cushion valve mounted on the plow to protect the cylinders from damage. Mounting plates for the swing cylinders shall be 0.63 inch in thickness. The cylinder mounting bolts shall be 1.00-inch diameter. The hydraulic port in the angling cylinders shall be 0.75-16 standard straight SAE "O" ring thread. The hoses used shall be standard 0.50 inch SAE 100R2 rated.
- The swing pin (center and vertical) shall be 2-inch diameter by 31.75 inch in length with top and bottom yokes. There shall be a bronze bushing installed in the center of each yoke assembly for low friction movement of the swing pin. The two (2) parallel tubular lift arms shall be attached to the top and bottom yokes. The yokes / lifting arms connections shall have a hardened steel sleeve bushing with replaceable trunnion pins. The trunnion pins must be tapered fit into the yoke for positive locking.
- The plow oscillation system shall incorporate a drive frame that allows oscillation of the plow with respect to the chassis in order to follow the pavement contour. The plow shall oscillate a minimum of 2 degrees overall. The oscillation mechanism shall consist of two front facing vertical plates which can pivot and slide. When the plow is carried in the raised position and angled right or left the plow shall remain approximately level to the pavement.
- The front plate shall be 0.50 inch thick steel plate with a bushing on the top for the oscillation pivot tube and slots cut in the bottom for the oscillation slide bushings. It shall be the middle support structure for the push frame. The back plate shall consist of a formed 0.38 inch plate and backing plate to form a boxed section. The oscillation pivot tube and oscillation slide bushings shall be welded in place facing forward on the boxed section. The back side of the boxed section shall attach to the plow swing pivot pin (center vertical).
- A 0.38 inch thick poly plate shall be sandwiched between the two oscillation plates to reduce friction and wear. No metal on metal. The oscillation assembly (two plates) shall be held together with five (5) bolts, 1.0 inch diameter with backing plates and lock nuts. There shall also be two (2) rubber cushions bolted to the plow push frame to limit and cushion the end of oscillation travel.

- The push frame shall be of severe duty design, welded construction with no less than three (3) horizontal steel tubes each having a cross section of 3 inch x 5 inch X 0.38 inch wall rectangular tube. There shall be six (6) “Aeon” type isomer rubber cushions on the bottom of the plow frame compressed to a length of 4 inch by means of six (6) bolts – 1.25 inch in diameter and six (6) lock nuts. For durability and safety on the runway, each cushion assembly shall have a 1.50-inch OD hardened steel sleeve tube over each bolt for sliding inside the push frame. This shall prevent over-compression of the rubber cushion when assembling and prevents wear of the bolt. The rubber cushions shall mount to a pivot weldment that connects the push frame to the moldboard via four (4) pivot pins. The pivot pins shall be 1045 CR steel, 1.50 inches in diameter.
- The swing stops shall have a poly liner installed to allow free oscillation of the plow frame. When swung to 32-degrees, the plow push frame shall stay against the stops as the operator raises and lowers the plow, no additional swing adjustment needed.
- Four (4) heavy-duty braces on top of the plow frame shall allow the plow and cutting edge angle to be adjusted to positions of 65, 75, and 85 degrees from horizontal for optimum snow handling performance.

8.3 **Front Reversible Plow:** These specifications describe a Power Reversible Plow with a tapered style flared discharge and polymer moldboard, manufactured expressly for airport runway high speed and ramp plowing. This plow shall be rigidly built of new material suited for continuous work under extreme conditions of snow removal.

- The moldboard shall not be less than 50 inches high across the length of the moldboard, to the discharge ends when the moldboard is set at 65° attack angle, nor less than 22 feet long at the cutting edge, and formed so as to lend itself to high speed plowing operations.
- Moldboard sheet shall be formed from 0.38 inch thick VHMW unwelded polyethylene sheet.
- When set at 75 degrees, the moldboard shall overhang the cutting edge by a minimum of twelve (12) inches across the entire length of the plow
- The sheet shall be formed from a polyethylene material that is made from new resin (recycled material is not acceptable), and shall be color impregnated and ultra violet stabilized to a Safety Yellow pigmentation for best visibility in snow removal operations.
- Welding of sheet will not accepted
- Moldboard reinforcement shall include a full length heavy duty angle across the top front of the steel shell and twelve (12) vertical ribs tying the upper shell to the cutting edge mounting angle and its reinforcement.
- Two ribs shall be installed at each of the four push points, and three ribs at the end of each flared end of the plow.
- The twelve (12) steel vertical ribs shall be made from 0.38 inch thick plate and have a varying cross section, becoming wider as they approach the cutting edge mounting angle.
- A 0.75 inch flat bar shall be welded to the cutting edge angle for additional strength.
- There shall be no span between reinforcing ribs in excess of 3.5 feet
- Provide two (2) plow blades. One installed on front hitch and one spare.
- The vertical ribs shall provide support and frame work for a series of window openings in the rear steel moldboard backing frame, tying top reinforcement to the bottom reinforcement.
- Window opening design shall provide long term, stable backing support for the moldboard, and help prevent moisture buildup behind the polymer plow face.

- Polymer moldboard shall be bolted to this durable framework for maintenance of proper snow handling shape.
- Moldboard shall consist of three (3) separate polyethylene sheets, one for the center section and one for each flared end of the plow.
- Polyethylene to be retained by 0.625 inch diameter carriage bolts with locking hardware to avoid loss on the operations area of the airfield
- Means of moldboard attack angle adjustment shall be incorporated so to provide 65, 75 and 85 degree settings (from ground plane to back of cutting edge) for use with either steel, carbide, rubber or urethane cutting edges throughout the life of the plow.
- To minimize vibration transmitted to the plow assembly, hitch and chassis, poly bushings shall be incorporated into the moldboard locating arms. The arms shall be attached to the moldboard with bolts rather than pins to provide the necessary clamping force to achieve the vibration reduction.
- A spray guard/deflector shall bolt to the top discharge point at the moldboard flange or reinforcement, tangential to the upper radius of the modified "J" style moldboard to direct snow forward, down, and toward the trailing edge of the plow. It shall consist of a heavy duty rubber belting, 0.40 inch thick x 12.00 inches wide, and shall include a metal retaining strap, 0.25 inch thick x 2.00 wide, with necessary mounting hardware.
- Hardware shall be of the locking type to minimize opportunity for loss on the aircraft operating areas of the airport. Provisions shall be provided in the mounting system to adjust the spray guard perpendicular to the moldboard on a case by case basis as desired by the airport for seasonal variation in operations.
- Cutting edge shall be of the tungsten carbide insert type with cover plate.
- Inserts shall be single beveled and the blade shall be not less than 0.75 inch thick by 6 inches wide. The cutting edge shall be supplied in multiple 3 and 4 foot sections to assemble the overall length for ease of installation and handling. The cover plate shall be 0.50 inch thick x 6.00 inches wide and be made of HR steel.
- Casters shall be capable of swiveling 360 degrees. Wheels shall be 10 inch diameter X 6 inch wide minimum, from not less than a combined thickness of 0.25 inch steel. Wheel shall be a five (5) mounting bolt design. They shall ride on hubs fitted with Timken tapered roller bearings. Each bearing shall include seal, dust cap, lubrication fitting and pressure relief plug. Axles shall be a minimum of 1.00 inch in diameter at the ends, 1.06 inch diameter at outer bearings, 1.375 inch diameter at the inner bearings and 1.75 inch diameter at the center. Each caster spindle shall have a rating of no less than 1,750 pounds for a combined caster position rating of 3,500 pounds.
- Tires shall be 20.5 x 8.0 on a 10 inch rim for additional load carrying ability, 10 ply (load range "E"), minimum. There shall be a total of at least four (4) tire and wheel assemblies, mounted in dual arrangements, with one dual assembly to each side of the plow center. Dual caster assembly shall include a two piece spindle, separated at the midpoint between caster wheels with left and right halves held in place by a through bolt with nyloc nut. This shall allow for easier and modular maintenance. Tires shall be pneumatic, and delivered with appropriate air pressure as shall be called out in service manuals to be provided with the machine.
- Vertical adjustment shall be accomplished through two (2) caster barrel arrangements. The outer barrels of the barrel arrangements shall be heavy duty steel tubing, not less than 4.25 inch OD x 3.75 inch ID, provided as part of the major caster mounting bracketry as a welded unit. Inner tubes shall be from not less than 3.25 inch OD x 2.25 inch ID for grease/lubrication fit. Inner tubing to be ground and hard chrome plated to mate with honed outer steel tube housing. Inner tube shall be held centered in outer tube by means of heavy duty nylon rings at top and bottom. The screw adjustment rod shall be heavy threaded rod fitted with jam nut for maintaining adjustment from not less than 1.375 inch diameter stainless steel.

- Each caster assembly shall be equipped with a spring loaded adjustable brake dampener so to minimize wheel wobble.
- The moldboard shall have a pair adjustable leg stands to be used for plow removal / storage with the other remaining weight on the caster tires. They shall aid in raising the cutting edge during change. They are required for safety and storage reasons.
- Push frame to have flat black powder coat finish to match chassis hood.

8.4 **Hydraulic System and Tank:** The hydraulic pump for the plow, underbody plow and spreader shall be driven by the chassis engine with sufficient flow and pressure capacity for all systems.

- There shall be quick disconnect couplers for the control lines of the plow and spreader.
- The operator's control for all systems (chassis, plow, underbody plow and spreader controls) in the chassis cab shall be an integrated console. It shall be constructed of heavy-duty materials and primed and painted black. The integration must be clean neat and operator friendly. All switches shall be lighted rocker style. It shall have all necessary functions to operate the plow, underbody plow, dump box, and spreader, and shall have the following:
 - Joystick for lift/lower and left/ right swing for the plow control.
 - Joystick for lift/lower, left/right swing and vertical position for the underbody plow
 - Switch for plow float on/off
 - Low hydraulic oil level warning light
 - Dow-pressure gauge for the underbody plow hydraulic circuit
 - Circuit breaker panel
 - Spreader ON/OFF switch
 - Spreader conveyor speed control
 - Spreader spinner speed control
 - Spreader blast
 - Spreader electronic controller has closed loop ground speed control for granular application to allow operator to focus on driving and plow operations
- Pump: The pump shall be a variable displacement with load sense pressure control for use with the spreader system. The pump shall be driven off the front crankshaft of the chassis engine with a fixed length driveshaft and a 1 inch 15 tooth spline, Spicer model 1310 series or larger. The pump shall have a displacement of 4.58 cubic inches per revolution minimum providing flow and pressure for all of the requirements of the plow and spreader.
- Hydraulic Reservoir: Minimum 30 gallon capacity with baffle. Equipped with visual sight glass and low oil level sensor, magnetic drain plug, 40-micron filter basket cap with riser as part of the tank. Minimum of 12-gauge steel construction. The tank shall be mounted outboard of the frame for ease of service.
- Hydraulic Filters: A 10 micron high-pressure filter shall be installed between the pump and control valves. A spin on return filter shall be mounted in the return line. Element to have a 10-micron rating. The filter must be above the fluid level in the reservoir to prevent fluid loss when changing the filter
- Hydraulic Control Valve: There shall be two control valves mounted connected in parallel. One is for the front plow control and underbody plow control functions, the other for the spreader. Each shall be an aluminum manifold with easily replaceable control valves without the need to separate a valve section. All of the plow and underbody plow functions shall consist of 4 way valves. A separate cartridge shall be activated for the plow float. An electrically activated load sense valve shall reduce pressure when no function is activated. The spreader control manifold shall have individual pulse width modulated proportional cartridges for the spreader conveyor and spinner. A relief shall be provided for the down pressure on the underbody plow

- Plumbing: Suction hoses shall be of sufficient size, minimum of 2 inch ID to prevent cavitation during cold starts. Pressure hoses shall be properly sized to minimize pressure loss connections from the pump to the control manifold will be ¾” ID, from the control manifold to the plow functions will be ½ ID. Flow in hoses must not exceed 25 ft/second. All pressure hoses will have a rating of 3000 PSI. All hoses shall be anchored away from bolts and sharp edges to prevent wear, fatigue or fire.

8.5 **Stainless Steel V Box Spreader:** The V-box spreader shall be mounted to the chassis frame rails. The spreader shall have a capacity of approximately 6 cubic yards. The box, spinner chute assembly and associated hardware shall be manufactured from 10 gauge 201 stainless steel.

- The sidewalls shall slope 45 degrees, the front and rear walls shall slope inward. Sides, side supports and ends shall be made from 10-gauge stainless steel. The top edge of the hopper shall be a formed inverted “J” 2 inches wide. Auger trough and longfills shall be 7-gauge stainless steel. The feed gate shall be 18 inches wide by 10 inch high and made from 10-gauge stainless steel. The gate shall be adjusted from ground level by a screw jack. Lift hooks shall be provided at each corner of the box.
- Top screens shall be provided with 2.75 inch grid opening to keep large chunks from entering the spreader. The grid shall be formed by .38-inch rods and the frame shall be constructed from .25 inch by 1.5-inch angle iron. The screens shall be hinged to a 5” I-beam.
- A stainless steel inverted V shaped section shall be installed over the conveyor. It shall be designed to prevent compaction of the material and to reduce the weight on the conveyor. The inverted V shall be bolted to the body sides.
- The spreader shall be equipped with a dual auger system for moving the aggregate. The augers shall be 7” diameter, variable pitch, and shall counter rotate. They shall be driven each by a 24.7 CIR hydraulic motor directly coupled to a 3.6:1 planetary gear case. The augers shall have polyurethane bushings at each end to prevent seizing
- The spinner chute assembly shall be made from 10-gauge stainless steel. The chute shall have at least 9 inches of telescopic height adjustment. The spinner shall be connected directly to the hydraulic motor output shaft. Adjustable baffles shall be provided above the spinner to direct the placement of material onto the spinner to alter the direction of the spread pattern. Adjustable baffles shall also be provided to prevent material from being broadcast outside of the desired discharge pattern. The spinner shall be polyurethane and have a diameter of 20 inches. The spinner chute assembly shall incorporate a two-position panel which when in the lowered position will cover the chute opening and allow material to bypass the spinner for stationary unloading. In the raised position, it will allow the material to fall into the spinner chute for normal spreading.
- Weld spatter shall be removed from the sander. The spreader shall be high-pressured cleaned with a phosphate solution to remove slag, splatter, oil residue and oxide. The sander shall be primed with a catalyzed primer then painted yellow enamel.
- The spreader shall have lights attached at the rear, each rear corner, in light boxes with three oval light cutouts. The topmost shall have an oval LED strobe light. The middle shall have red LED stop/turn/tail lights and the lowest shall have oval LED backup lights. A one-piece wiring harness shall be supplied for clearance and stop / turn / tail lights and back-up lights.
- The body shall have a “1/2 cab shield” which shall partially cover the truck cab to protect it from aggregate spilling from a loader bucket. The shield shall be 100% welded to the front of the dump body and shall be fabricated from 10-gauge stainless steel.

Section 9: Miscellaneous Details

9.1 **Treating and Painting:** All parts of the vehicle and auxiliary equipment shall be cleaned, treated and primed prior to assembly. After the vehicle is completely assembled, except for bright trim parts, if provided, the entire unit shall be puttied, water sanded, and two coats of corrosion inhibitive primer applied and painted the specified color with a lead-free and chromate-free baked polyurethane enamel finish. Paint shall be applied in not less than two coats. The finished paint shall be free from “orange peel”, pebble finish, runs or other imperfections. The vehicle color shall be FAA approved chrome yellow acrylic meeting the requirements of FAA Advisory Circular 150/5210-5B. Surfaces of the hood that face the operator shall be painted flat black to reduce glare. Vehicle lettering and logo, coordinated with the Airport Sponsor, shall be provided by the contractor on each side and top, as large as practical. Decal must be one piece and applied professionally. No decal shall be placed on the vehicle until the airport sponsor has approved its design. The complete vehicle (moldings, fenders, doors, panel wells, underside of cab floor, etc.) shall be treated with Ziebart rust proofing protection or an approved equal.

9.2 **Name Plates and Instruction Plates:** All nameplates and instruction plates shall be metal or plastic, which weathering will not degrade. The information shall be engraved, stamped or etched on each plate. If metal, they shall be made of non-corrosive material, chrome plated or nickel silvered. All plates shall be attached with screws, bolts or rivets. Each plate shall be mounted in a conspicuous place. Nameplates shall show make, model, serial number and other such data as to positively identify the item. Information plates shall be in English and provide important instructions to be followed in operating or servicing the vehicle or equipment. The information plate shall include warnings or cautions and shall be so located and be of sufficient size to be readily seen under normal operating and/or servicing conditions.

9.3 **Technical Publications:** The contractor shall furnish one CD and one printed set plus internet access to parts books, or two printed sets if CDs or internet access to parts books is not available, of the following publications in accordance with standard commercial practices applicable to the vehicle furnished under this contract, complete with auxiliary equipment. Manuals shall be printed in English. Engine manuals shall be provided for the carrier engine. Each set shall be composed of one copy each of:

1. Operator’s Manual with lubrication charts
2. Parts Manual
3. Maintenance and Service Manual

A. Technical Publications Contents: The Operator’s Manual, Parts Manual and Maintenance/Service Manual shall cover the complete vehicle and shall be in accordance with the following: Operating instructions shall include all information required for operation of the vehicle and main equipment, special attachments and auxiliary equipment under the expected climatic conditions. Location and function of all controls and instruments shall be covered by illustrations and descriptions.

These instructions shall also include, but not be limited to the following:

1. Complete description of the vehicle and special equipment
2. Preparation for use of the vehicle upon receipt
3. Operator daily maintenance and mission readiness checks
4. Periodic operator inspection/maintenance

- B. **Parts List:** The parts list shall include illustrations and exploded views necessary for the proper identification of all parts, assemblies, sub-assemblies and special equipment. Assemblies or components shall be shown in illustrations and be identified by reference numbers, which correspond to the reference numbers in the parts list. The size, thread dimensions and special characteristics shall be given on all non-standard nuts, bolts, washers, grease fittings and similar items. The parts identification manual shall show the description and quantity of each item used per vehicle, and shall contain a numerical index.
- C. **Maintenance/Service Manual:** The repair and overhaul instructions shall be factual, specific, concise and clearly worded so as to be readily understood by a qualified mechanic with no previous experience on the equipment being purchased. The instructions shall cover such typical maintenance and repair operations as troubleshooting, adjustment procedures, minor and major repairs and overhaul, removal and replacement of units, assemblies and sub-assemblies, and complete instructions for disassembly and reassembly of components. The instructions shall also include data listing tolerances, specifications and capacities. Illustrations, wiring diagrams and exploded views shall be used to clarify text and should appear as close to the related text as possible. Special tools required for the repair and overhaul of the equipment shall be listed and illustrated. The service manual shall contain an alphabetical subject index.

9.5 **Dynamometer:** The unit is to be delivered with a chassis dynamometer test report verifying proper operation and power output of chassis engine and drive train. Dynamometer test shall require engine & chassis to be run for at least 20 minutes and shall show run up to full power output with chassis mph to 45 mph minimum, and to at least 90% of maximum horsepower output. Test report to include truck serial number. A sample of chassis dynamometer testing is to be provided in the bid package. This sample shall verify that such testing is standard practice for the manufacturer. A special procedure to satisfy this requirement for this procurement only does not demonstrate the quality procedures and standards desired by the purchaser.

9.6 **Alignment:** The vehicle is to be delivered with a wheel alignment report verifying proper alignment and set up of all steering axles, both left and right side. Report shall show camber, caster and toe-in before and after adjustment against acceptable product limits. A sample of such alignment report is to be provided in the bid package. This sample shall verify that such testing is standard practice for the manufacturer. A special procedure to satisfy this requirement for this procurement only does not demonstrate the quality procedures and standards desired by the purchaser.

Section 10: Quality Assurance

10.1 **Vehicle Design Principles:** The vehicle design shall provide for removal of snow with maximum maneuverability and versatility, visibility, ease of operation, safety, reliability and accessibility for repairs and maintenance.

10.2 **Responsibility of Contractors and Suppliers:** The contractor must assume complete responsibility for all component parts of the entire vehicle, even though portions may be sub-contracted. This responsibility shall include design, construction, inspection, performance testing and servicing. It shall be the contractor's responsibility to remain capable of furnishing parts and technical assistance to the SPONSOR for the normal life of the vehicle, being twenty (20) years. The contractor shall also be responsible for assuring that the vehicle

meets the specified criteria. All components shall have the manufacturer's approval and recommendation for the intended service and the manufacturer's rating shall not be exceeded by the actual loads imposed. The contractor shall supply operators, parts and service manuals. If the contractor is not able to assume the abovementioned responsibilities, for whatever reason, he must tabulate all exceptions to the responsibility requirements of these specifications in the proposal along with the bid.

- 10.3 **Preparation and Shipment:** The vehicle and its accessories shall be packed in such a manner as to prevent pilferage and ensure safe delivery to the Muskegon County Airport. Deliver shall be by lowboy trailer, for all movement of the vehicle, at the expenses of the manufacturer or supplier.
- 10.4 **Radio Interference:** Tests for radio interference suppression shall be conducted on the vehicle. All testing equipment, instruments, personnel making the test, the test location (which shall be reasonably free from radiated and conducted interference) and other necessary facilities shall be furnished by the contractor. Independent test certifications shall be acceptable for this type of vehicle and should accompany the delivered vehicle. The acceptance of the test certification in no way reduces the responsibility of the contractor to eliminate radio interference.
- 10.5 **Certification:** The manufacturer must be certified to the quality standard ISO 9001 for the production of heavy duty Intermediate Plow. Vendor certification must be supplied prior to delivery for the engine, transmission, power divider, transfer case and axles, as applicable. Each bid must include the vehicle (chassis) manufacturer's certification that the vehicle (chassis) meets or exceeds the following requirements based on documented test results. Documented test results shall be provided upon request.

FMVSS 571-103	Windshield defrosting and defogging systems, in accordance with J1944, J198
FMVSS 571-121	Air brake systems
FMVSS 571-207	Seating systems
FMVSS 571-210	Seat belt assembly
40 CFR CH.1	Pass by noise levels (in accordance with SAE J366)
FMCSR 393.94	Vehicle interior noise levels
FMVSS 571-101	Controls and displays
FMVSS 571-108	Lamps, reflective devices and associated equipment
FMVSS 571-120	Tire selection and rims for motor vehicles other than passenger cars
FMVSS 571-206	Door locks and door retention components
FMVSS 271-209	Seat belt assemblies
FMCSR 393-65	Fuel systems and fuel tanks
FMCSR 205	Glazing for windows
FMCSR 302	Flammability of interior materials

- 10.6 **Instruction and Training:** The contractor shall arrange for a service representative to conduct an operator's training course to demonstrate the equipment and a mechanic's service training, each lasting at least eight (8) hours at the customer's location. Training may be conducted with the use of videotape programs, operator's, parts and service manuals and hands-on demonstration relative to the correct operation and maintenance of the vehicle. The functioning of the engine, power train, hydraulic system, brakes, steering, lighting system, controls and instruments shall be demonstrated. The contractor shall include in his bid provision to provide a minimum of eight (8) hours of vehicle mechanic training at the manufacturing facility. The bid shall include air transportation, lodging and meals for one

mechanic at the vehicle manufacturer's facility. Training shall be coordinated with the airport SPONSOR.

10.7 **Service and Inspection:** In the interest of prompt service, and when or if such service is required, the manufacturer must have an authorized dealer with trained service personnel and readily available parts within 300 miles of Muskegon, Michigan to be able to respond to next day service. This service facility must make available factory trained mechanics that are completely trained in the delivery in-service, service, and maintenance of the unit offered and must be equipped to offer prompt service on the unit at the in-service location. These mechanics must hold current and valid certifications from the manufacturer. All bidders must be capable of servicing the entire unit including the chassis, and any auxiliary equipment provided thereon. After delivery the contractor shall arrange for a service representative to perform a complete service inspection at six months from the date of SPONSOR acceptance. The service inspection shall consist of an in-depth evaluation of all interface systems and components and be coordinated with the airport SPONSOR. A special checklist for the inspection shall be provided to properly record all phases of the inspection.

10.8 **Warranty:** The contractor must supply a warranty statement that will include the following as a minimum:

1. Manufacturer's obligations
2. Duration of warranty period
3. Warranty procedure
4. Disclaimers

As a minimum, the contractor's warranty shall extend for two years on the entire vehicle, including all equipment or trade accessories (except tires, storage batteries, electric lamps and other devices subject to normal deterioration) supplied by the contractor and shall extend for a minimum of two (2) full years on the frame and cross members. The engines and transmission shall be included in a full power train warranty for a minimum period of five (5) years. Hitches, material spreader, hydraulic and control systems shall be included in a minimum two (2) year warranty. Parts developing defects within one year after making delivery of such vehicle to the original purchaser must be returned to the contractor with transportation charges prepaid and which on the examination by the manufacturer, shall disclose to his satisfaction to have been thus defective.

REFERENCES

The vendor must furnish at least five (5) references from persons who can attest to the quality of similar equipment delivered within the last five (5) years:

1. Company Name: _____

 Street Address: _____

 City/State/Zip Code: _____

 Contact Person: _____

 Delivery Date: _____

 Phone No.: _____

2. Company Name: _____

 Street Address: _____

 City/State/Zip Code: _____

 Contact Person: _____

 Delivery Date: _____

 Phone No.: _____

3. Company Name: _____

 Street Address: _____

 City/State/Zip Code: _____

 Contact Person: _____

 Delivery Date: _____

 Phone No.: _____

4. Company Name: _____
Street Address: _____
City/State/Zip Code: _____
Contact Person: _____
Delivery Date: _____
Phone No.: _____

5. Company Name: _____
Street Address: _____
City/State/Zip Code: _____
Contact Person: _____
Delivery Date: _____
Phone No.: _____