

STATE OF MICHIGAN  
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
 PROCUREMENT  
 P.O. BOX 30026, LANSING, MI 48909  
 OR  
 525 W. ALLEGAN, LANSING, MI 48933

**CHANGE NOTICE NO. 3**  
 to  
**CONTRACT NO. 071B3200070**  
 between  
**THE STATE OF MICHIGAN**  
 and

NAME & ADDRESS OF CONTRACTOR	PRIMARY CONTACT	EMAIL
The Sanborn Map Company, Inc. 1935 Jamboree Drive Colorado Springs CO, 80920	Brad Arshat	barshat@sanborn.com
	PHONE	CONTRACTOR'S TAX ID NO. (LAST FOUR DIGITS ONLY)
	443-603-7725	*****0333

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
PROGRAM MANAGER / CCI	DTMB	Surber, Rob	517-335-2820	surberr@Michigan.gov
CONTRACT ADMINISTRATOR	DTMB	Terry Mead	517-284-7035	meadt@michigan.gov

CONTRACT SUMMARY			
<b>DESCRIPTION:</b> Aerial Imagery Services			
INITIAL EFFECTIVE DATE	INITIAL EXPIRATION DATE	INITIAL AVAILABLE OPTIONS	EXPIRATION DATE BEFORE CHANGE(S) NOTED BELOW
February 7, 2013	February 6, 2016	2 - 1 Year	February 6, 2016
PAYMENT TERMS		DELIVERY TIMEFRAME	
N/A		N/A	
ALTERNATE PAYMENT OPTIONS			EXTENDED PURCHASING
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
MINIMUM DELIVERY REQUIREMENTS			
N/A			

DESCRIPTION OF CHANGE NOTICE				
EXERCISE OPTION?	LENGTH OF OPTION	EXERCISE EXTENSION?	LENGTH OF EXTENSION	REVISED EXP. DATE
<input type="checkbox"/>		<input type="checkbox"/>		
CURRENT VALUE		VALUE OF CHANGE NOTICE	ESTIMATED AGGREGATE CONTRACT VALUE	
\$4,311,641.14		\$ 403,679.45	\$4,715,320.59	

**DESCRIPTION:** Effective 1/26/2016, Contract value is increased by \$403,679.45 to provide adequate funds for the attached Statement of Work and price quotes for the MiSAIL Program in order to complete the data processing portion of the Fall 2015 Light-Detection and Ranging (LiDAR), for six Michigan counties under the FEMA partnership with DEQ. This is allowable per the existing contract terms. All other terms, conditions, specifications, and pricing remain the same. Per Agency request, DTMB Procurement approval, and State Administrative Board approval on 1/26/2016.



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES STATEMENT OF WORK**

<b>Project Title:</b> MiSAIL Fall 2015 LIDAR collect	<b>Period of Coverage:</b> 10/22/2015-6/1/2016
<b>Requesting Department:</b> DTMB – Center for Shared Solutions	<b>Date:</b> 10/22/2015
<b>Agency Project Manager:</b> Everett Root	<b>Phone:</b> 517-373-7910
<b>DTMB Project Manager:</b> Rob Surber	<b>Phone:</b> 517-373-7910

Brief Description of Services to be provided:

**BACKGROUND:**

CSS is in a current contract with Sanborn Map Company for Aerial Imagery Services.

**PROJECT OBJECTIVE:**

CSS is requesting to add funds

**SCOPE OF WORK:**

Process the Fall 2015 LIDAR per the geographic region described in Tasks & Deliverables for the MiSAIL program.

**TASKS & DELIVERABLES:**

**Products to be Delivered:**

Project boundary shapefile	<i>Cass_Kazoo_St.Joe_buffer_dissolved Gen_Lap_Shia_buffer_dissolved</i>	[comment]
Communities to be acquired	<i>Cass, Kalamazoo, Saint Joseph, Genesee, Lapeer, Shiawassee counties</i>	[comment]
Square Mileage from boundary shapefile	3,487 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**LIDAR**

Quality Level	QL 2	[comment]
Base Product	NA	[comment]
Classified Point Cloud (Option 1)	Yes	[comment]
Bare Earth Surface (Option 2)	Yes	[comment]
Hydro-Flattened Bare Earth (Option 3)	Yes	[comment]
Hydro Enforcement (Option 4)	No	[comment]
Intensity Images (Option 5)	Yes	[comment]

**Insert Pricing Table Here:**

<b>2015 AOI</b>	<b>Cost</b>
Project Total	\$403,679.45

**ACCEPTANCE CRITERIA:**

Deliverables will be reviewed and checked for quality at CSS before accepted.

**PROJECT CONTROL AND REPORTS:**

This is a deliverables based contract.

**PAYMENT SCHEDULE:**

Payment will be made upon receipt of products listed under deliverables section.

**EXPENSES:**

Only expenses outlined in the deliverables table will be paid.

**PROJECT CONTACT:**

Everett Root

DTMB, Center for Shared Solutions

G.W. Romney Building, 10<sup>th</sup> Floor

111 S. Capitol Ave.

Lansing, MI 48913

517-373-7910

[roote@michigan.gov](mailto:roote@michigan.gov)

**AGENCY RESPONSIBILITIES:**

Reserved



Corporate Headquarters  
 1935 Jamboree Drive  
 Suite 100  
 Colorado Springs, CO 80920

Phone: 719.593.0093  
 Toll-Free: 1.866.726.2676  
 Fax: 719.528.5093  
 www.sanborn.com

December 18, 2015

Mr. Everett Root  
 Outreach Specialist  
 Office of Technology Partnerships  
 Department of Technology, Management and Budget  
 State of Michigan  
 111 S. Capitol Ave., 10th Floor Romney  
 Lansing, MI 48933  
 Email: RootE@michigan.gov

Re: Quotation for 2015 MISAIL Program Fall LiDAR Collection – Data Processing Only

Dear Mr. Root:

The Sanborn Map Company, Inc. (Sanborn) is pleased to continue our partnership with the State of Michigan in the MISAIL program in Flight Year 2015. We are submitting our quotation for this, the third year of performance, in response to the statement of requirements you have provided for the FEMA LiDAR project, and in keeping with all provisions of the contract governing this program. A table with a scope and fee summary for the entire project is provided below for each county grouping. However, this quotation covers the data processing component only.

Cass, Kalamazoo and St. Joseph Counties			
Product	Square Mileage	Price Per Square Mile Base 1001-5000	Base Total
Lidar Base QL2 (Sanborn Base Product)	1621	\$107.19	\$173,754.99
Classified Point Cloud QL2 (Sanborn Option 1)	1621	\$26.13	\$42,356.73
Bare Earth Surface QL2 (Sanborn Option 2)	1621	\$13.97	\$22,645.37
Hydro-Flattened Bare Earth (Sanborn Option 3)	1621	\$10.06	\$16,307.26
Option 5 (intensity images; no cost)	1621	\$0.00	\$0.00
<b>LiDAR Total</b>			<b>\$255,064.35</b>

*Q*

Genesee, Lapeer and Shiawassee Counties			
Product	Square Mileage	Price Per Square Mile Base 1001-5000	Base Total
Lidar Base QL2 (Sanborn Base Product)	1866	\$107.19	\$200,016.54
Classified Point Cloud QL2 (Sanborn Option 1)	1866	\$26.13	\$48,758.58
Bare Earth Surface QL2 (Sanborn Option 2)	1866	\$13.97	\$26,068.02
Hydro-Flattened Bare Earth (Sanborn Option 3)	1866	\$10.06	\$18,771.96
Option 5 (intensity images; no cost)	1866	\$0.00	\$0.00
<b>LiDAR Total</b>			<b>\$293,615.10</b>

The total fee for the data processing component of this project is **\$403,679.45**.

We believe that this document has addressed all of your requirements. However, should you have questions or need clarification on any matter, please contact Mr. Brad Arshat, Director, Strategic Accounts, via phone: 443-603-7725, fax: 719-528-5093, or email: [barshat@sanborn.com](mailto:barshat@sanborn.com). We appreciate the opportunity to submit this quotation and look forward to hearing from you.

Sincerely,



John R. Copple

President/CEO

STATE OF MICHIGAN  
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
 PROCUREMENT  
 P.O. BOX 30026, LANSING, MI 48909  
 OR  
 530 W. ALLEGAN, LANSING, MI 48933

**CHANGE NOTICE NO. 2**  
 to  
**CONTRACT NO. 071B3200070**  
 between  
**THE STATE OF MICHIGAN**  
 and

NAME & ADDRESS OF CONTRACTOR:	PRIMARY CONTACT	EMAIL
The Sanborn Map Company, Inc. 1935 Jamboree Dr. , Suite 100 Colorado Springs, CO 80920	Brad Arshat	<a href="mailto:barshat@sanborn.com">barshat@sanborn.com</a>
	TELEPHONE	CONTRACTOR #, MAIL CODE
	(443) 603-7725	

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
CONTRACT COMPLIANCE INSPECTOR:	DTMB	Rob Surber	517-335-2820	<a href="mailto:surberr@michigan.gov">surberr@michigan.gov</a>
BUYER:	DTMB	Christine Mitchell	517-284-7020	<a href="mailto:mitchellc4@michigan.gov">mitchellc4@michigan.gov</a>

CONTRACT SUMMARY:			
DESCRIPTION: <b>Aerial Imagery (Orthophotography) Services</b>			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION DATE	AVAILABLE OPTIONS
3 Years	February 7, 2013	February 6, 2016	2, 1 Year Options
PAYMENT TERMS	F.O.B	SHIPPED	SHIPPED FROM
N/A	N/A	N/A	N/A
ALTERNATE PAYMENT OPTIONS:			AVAILABLE TO MiDEAL PARTICIPANTS
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
MINIMUM DELIVERY REQUIREMENTS:			
N/A			

DESCRIPTION OF CHANGE NOTICE:				
EXTEND CONTRACT EXPIRATION DATE	EXERCISE CONTRACT OPTION YEAR(S)	EXTENSION BEYOND CONTRACT OPTION YEARS	LENGTH OF OPTION/EXTENSION	EXPIRATION DATE AFTER CHANGE
<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>		February 6, 2016
COST OF CHANGE NOTICE:			ESTIMATED REVISED AGGREGATE CONTRACT VALUE:	
\$2,672,415.47			\$4,310,641.14	
Effective June 2, 2015, Contract value is hereby increased by \$2,672,415.47 to provide adequate funds for the attached two Statements of Work and pricing schedules incorporating the 2015-16 MISAIL (\$1,154,349.43) and 2015 LIDAR (\$1,318,066.04) Projects, with an additional \$200,000.00 reserve to cover unexpected changes for the balance of the contract term. This is allowable per the existing contract terms. All other terms, conditions, specifications, and pricing remain the same. Per agency request, DTMB Procurement approval, and State Administrative Board approval on 6/2/2015.				



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES STATEMENT OF WORK**

Project Title: MiSAIL 2015 LIDAR collect	Period of Coverage: 4/1/2015-4/1/2016
Requesting Department: DTMB – Center for Shared Solutions	Date: 3/6/2015
Agency Project Manager: Everett Root	Phone: 517-373-7910
DTMB Project Manager: Rob Surber	Phone: 517-373-7910

Brief Description of Services to be provided:

**BACKGROUND:**

CSS is in a current contract with Sanborn Map Company for Aerial Imagery Services.

**PROJECT OBJECTIVE:**

CSS is requesting to draw the remaining funds and add funds

**SCOPE OF WORK:**

To complete the 2015 LIDAR acquisition on the MiSAIL program.

**TASKS & DELIVERABLES:**

**Products to be Delivered:**

Project boundary shapefile	<i>MI FEMA 2015 Lidar AOI Final V2.shp</i>	[comment]
Communities to be acquired	<i>Benzie, Grand Traverse, Leelanau, Manistee, Alger, Baraga, Delta, Marquette, Emmet, Mackinac counties</i>	[comment]
Square Mileage from boundary shapefile	8632 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**LIDAR**

Quality Level	QL 2	[comment]
Base Product	Yes	[comment]
Classified Point Cloud (Option 1)	Yes	[comment]
Bare Earth Surface (Option 2)	Yes	[comment]
Hydro-Flattened Bare Earth (Option 3)	Yes	[comment]
Hydro Enforcement (Option 4)	No	[comment]
Intensity Images (Option 5)	Yes	[comment]

**Insert Pricing Table Here:**

2015 AOI	Cost
Project Total	\$1,318,066.04

**ACCEPTANCE CRITERIA:**

Deliverables will be reviewed and checked for quality at CSS before acceptance.

**PROJECT CONTROL AND REPORTS:**

This is a deliverables based contract.

**PAYMENT SCHEDULE:**

Payment will be made upon receipt of products listed under deliverables section.

**EXPENSES:**

**Only expenses outlined in the deliverables table will be paid.**

**PROJECT CONTACT:**

Everett Root  
DTMB, Center for Shared Solutions  
G.W. Romney Building, 10<sup>th</sup> Floor  
111 S. Capitol Ave.  
Lansing, MI 48913  
517-373-7910  
[roote@michigan.gov](mailto:roote@michigan.gov)

**AGENCY RESPONSIBILITIES:**

Reserved



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 Suite 100  
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Phone: 719.593.0093  
 Toll-Free: 1.866.726.2676  
 Fax: 719.528.5093  
 www.sanborn.com

March 11, 2015

Mr. Everett Root  
 Outreach Specialist  
 Office of Technology Partnerships  
 Department of Technology, Management and Budget  
 State of Michigan  
 111 S. Capitol Ave., 10th Floor Romney  
 Lansing, MI 48933

Re: Quotation for 2015 MISAIL Program FEMA LiDAR

Dear Mr. Root:

The Sanborn Map Company, Inc. (Sanborn) is pleased to continue our partnership with the State of Michigan in the MISAIL program in Flight Year 2015. We are submitting our quotation for this, the third year of performance, in response to the statement of requirements you have provided for the FEMA LiDAR project, and in keeping with all provisions of the contract governing this program. A table with a scope and fee summary is provided below for each county grouping.

Benzie, Grand Traverse, Leelanau, Manistee Grouping			
Product	Square Mileage	Price Per Square Mile Base 1001-5000 Sq Miles	Base Total
LiDAR Base QL2 (Sanborn Base Product)	1813	\$107.19	\$194,335.47
Classified Point Cloud QL2 (Sanborn Option 1)	1813	\$26.13	\$47,373.69
Bare Earth Surface QL2 (Sanborn Option 2)	1813	\$13.97	\$25,327.61
Hydro-Flattened Bare Earth (Sanborn Option 3)	1813	\$10.06	\$18,238.78
<b>BENZIE, GRAND TRAVERSE, LEELANAU, MANISTEE SUBTOTAL</b>			<b>\$285,275.55</b>

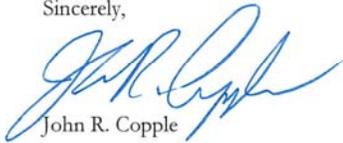
Alger, Baraga, Delta, Marquette Grouping			
Product	Square Mileage	Price Per Square Mile Base >5001 Sq Miles	Base Total
LiDAR Base QL2 (Sanborn Base Product)	5138	\$99.44	\$510,922.72
Classified Point Cloud QL2 (Sanborn Option 1)	5138	\$26.06	\$133,896.28
Bare Earth Surface QL2 (Sanborn Option 2)	5138	\$13.97	\$71,777.86
Hydro-Flattened Bare Earth (Sanborn Option 3)	5138	\$10.06	\$51,688.28
<b>ALGER, BARAGA, DELTA, MARQUETTE SUBTOTAL</b>			<b>\$768,285.14</b>

Emmet, Mackinac Grouping			
Product	Square Mileage	Price Per Square Mile Base 1001-5000 Sq Miles	Base Total
LiDAR Base QL2 (Sanborn Base Product)	1681	\$107.19	\$180,186.39
Classified Point Cloud QL2 (Sanborn Option 1)	1681	\$26.13	\$43,924.53
Bare Earth Surface QL2 (Sanborn Option 2)	1681	\$13.97	\$23,483.57
Hydro-Flattened Bare Earth (Sanborn Option 3)	1681	\$10.06	\$16,910.86
<b>EMMET, MACKINAC SUBTOTAL</b>			<b>\$264,505.35</b>

The total fee for all products and services quoted above is **\$1,318,066.04**.

We believe that this document has addressed all of your requirements. However, should you have questions or need clarification on any matter, please contact Mr. Brad Arshat, Director, Strategic Accounts, via phone: 443-603-7725, fax: 719-528-5093, or email: [barshat@sanborn.com](mailto:barshat@sanborn.com). We appreciate the opportunity to submit this quotation and look forward to hearing from you.

Sincerely,



John R. Copple

President/CEO



**MICHIGAN DEPARTMENT OF TECHNOLOGY,  
MANAGEMENT AND BUDGET  
IT SERVICES STATEMENT OF WORK**

<b>Project Title:</b> MiSAIL 2015 Imagery collect	<b>Period of Coverage:</b> 4/1/2015-4/1/2016
<b>Requesting Department:</b> DTMB – Center for Shared Solutions	<b>Date:</b> 3/6/2015
<b>Agency Project Manager:</b> Everett Root	<b>Phone:</b> 517-373-7910
<b>DTMB Project Manager:</b> Rob Surber	<b>Phone:</b> 517-373-7910

Brief Description of Services to be provided:

**BACKGROUND:**

CSS is in a current contract with Sanborn Map Company for Aerial Imagery Services.

**PROJECT OBJECTIVE:**

CSS is requesting to draw the remaining funds and add funds

**SCOPE OF WORK:**

To complete the 2015 Imagery acquisition on the MiSAIL program.

**TASKS & DELIVERABLES:**

**Products to be Delivered:**

**PRODUCT SCHEDULE  
CLINTON COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>Clinton_2015_AOI</i>	[comment]
Communities to be acquired	<i>Clinton County</i>	[comment]
Square Mileage from boundary shapefile	574 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	6" & 12"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	<b>\$400 option</b> Default is MrSID at 20:1

		compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
EATON COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>Eaton_2015_AOI</i>	[comment]
Communities to be acquired	<i>Eaton County</i>	[comment]
Square Mileage from boundary shapefile	<i>579 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>6" &amp; 12"</i>	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
INGHAM COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>Ingham_2015_AOI</i>	[comment]
Communities to be acquired	<i>Ingham County (part)</i>	[comment]
Square Mileage from boundary shapefile	<i>471 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate	[comment]
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	zone), North American Datum 1983(1986), International feet	
Additional Coordinate System	NA	[comment]
Resolution	6" & 12"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
LANSING BOARD of WATER and LIGHT (BWL)**

**Products to be Delivered:**

Project boundary shapefile	<i>BWL_2015_AOI</i>	[comment]
Communities to be acquired	<i>Parts of Clinton, Eaton, Ingham counties</i>	[comment]
Square Mileage from boundary shapefile	205 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	3" & 12"	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
DELHI TOWNSHIP**

**Products to be Delivered:**

Project boundary shapefile	<i>Delhi_Twp_2015_AOI</i>	[comment]
Communities to be acquired	<i>Delhi Twp</i>	[comment]
Square Mileage from boundary shapefile	29.5 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>3" &amp; 12"</i>	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**LIDAR**

Quality Level	1	[comment]
Base Product	Yes	[comment]
Classified Point Cloud (Option 1)	Yes	[comment]
Bare Earth Surface (Option 2)	Yes	[comment]
Hydro-Flattened Bare Earth (Option 3)	Yes	[comment]
Hydro Enforcement (Option 4)	Yes	[comment]
Intensity Images (Option 5)	Yes	[comment]

**PRODUCT SCHEDULE  
DEWITT****Products to be Delivered:**

Project boundary shapefile	<i>Dewitt_2015_AOI</i>	[comment]
Communities to be acquired	<i>City of Dewitt</i>	[comment]
Square Mileage from boundary shapefile	3 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>3" &amp; 12"</i>	3" to be resampled to 12" for

		delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
EAST LANSING**

**Products to be Delivered:**

Project boundary shapefile	<i>East_Lansing_2015_AOI</i>	[comment]
Communities to be acquired	<i>City of East Lansing</i>	[comment]
Square Mileage from boundary shapefile	<i>13.5 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>3" &amp; 12"</i>	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
LANSING**

**Products to be Delivered:**

Project boundary shapefile	<i>Lansing_2015_AOI and Lansing_CBD</i>	[comment]
Communities to be acquired	<i>City of Lansing</i>	[comment]

Square Mileage from boundary shapefile	39.8 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	3" & 12" + 3" CBD	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
LANSING TOWNSHIP**

**Products to be Delivered:**

Project boundary shapefile	<i>Lansing_Twp_2015_AOI</i>	[comment]
Communities to be acquired	<i>Lansing Twp</i>	[comment]
Square Mileage from boundary shapefile	5 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	3" & 12"	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
MERIDIAN TOWNSHIP**

**Products to be Delivered:**

Project boundary shapefile	<i>Meridian_Twp_2015_AOI</i>	[comment]
Communities to be acquired	<i>Meridian Twp</i>	[comment]
Square Mileage from boundary shapefile	<i>31.638 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>3" &amp; 12"</i>	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
MSU MAIN CAMPUS**

**Products to be Delivered:**

Project boundary shapefile	<i>MSU_Main_Campus_2015_AOI</i>	[comment]
Communities to be acquired	<i>MSU Main Campus – Ingham County</i>	[comment]
Square Mileage from boundary shapefile	<i>15.7 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
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Additional Coordinate System	NA	[comment]
Resolution	3" & 12"	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
ST JOHNS**

**Products to be Delivered:**

Project boundary shapefile	<i>StJohns_2015_AOI</i>	[comment]
Communities to be acquired	<i>City St Johns</i>	[comment]
Square Mileage from boundary shapefile	10 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	3"	[comment]
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
GENESEE COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>Genesee_AOI_2015</i>	[comment]
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Communities to be acquired	<i>Genesee County</i>	[comment]
Square Mileage from boundary shapefile	663 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
HILLSDALE COUNTY  
Plus  
Hillsdale city, Litchfield city, Somerset Township**

**Products to be Delivered:**

Project boundary shapefile	<i>Hillsdale_Final_Clippping Hillsdale_6inAOI</i>	[comment]
Communities to be acquired	<i>Hillsdale County Hillsdale City Litchfield City Somerset Twp.</i>	[comment]
Square Mileage from boundary shapefile	632 Square Miles 12" 34.67 Square Miles 6"	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12", 6"</i>	[comment]

County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
Lexington Township (Sanilac County)**

**Products to be Delivered:**

Project boundary shapefile	<i>Lexington_Twp_bndry_100mbuffer</i>	[comment]
Communities to be acquired	<i>Lexington Twp</i>	[comment]
Square Mileage from boundary shapefile	38.4 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>No</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>No</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
Worth Township (Sanilac County)**

**Products to be Delivered:**

Project boundary shapefile	<i>Worth_Twp_bndry_100mbuffer</i>	[comment]
Communities to be acquired	<i>Worth Township</i>	[comment]
Square Mileage from boundary shapefile	40.4 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate	[comment]
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	zone), North American Datum 1983(1986), International feet	
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>No</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
ST JOSEPH COUNTY  
Plus Sturgis city**

**Products to be Delivered:**

Project boundary shapefile	<i>SJC2015_AOI StrugisCity2015_AOI</i>	[comment]
Communities to be acquired	<i>St Joseph County City of Sturgis</i>	[comment]
Square Mileage from boundary shapefile	535 Square Miles (County) 70 Square Miles (Sturgis)	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>[coordinate system]</i>	[comment]
Resolution	<i>12" County 6" Sturgis</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>No</i>	BufferedImageGrid.shp

**PRODUCT SCHEDULE**

## LIVINGSTON COUNTY

### Products to be Delivered:

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Livingston County</i>	[comment]
Square Mileage from boundary shapefile	559 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	6"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

## PRODUCT SCHEDULE Hartland Township (Livingston County)

### Products to be Delivered:

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Hartland Township</i>	[comment]
Square Mileage from boundary shapefile	40 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	3"	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>NA</i>	NA
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]

Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
MACOMB COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Macomb County</i>	[comment]
Square Mileage from boundary shapefile	538 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane south zone, FIPS2113, North American Datum 1983(1986), International feet	Note NOT HARN DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	3"	3" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
MONROE COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Monroe County</i>	[comment]
Square Mileage from boundary shapefile	609 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	6"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
OAKLAND COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Oakland County</i>	[comment]
Square Mileage from boundary shapefile	909 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane south zone, FIPS 2113, North American Datum 1983(1986), International feet	Note NOT HARN DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	6"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>NOTE</b> County provided custom clipping shapefile <b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
ST CLAIR COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>St Clair County</i>	[comment]
Square Mileage from boundary shapefile	774 Square Miles 515 @ 12" 204 @ 6" 55 @ 3"	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12", 6", 3"</i>	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	<i>Yes</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
WASHTENAW COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Washtenaw County</i>	[comment]
Square Mileage from boundary shapefile	744 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]

Resolution	6"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
WAYNE COUNTY**

**Products to be Delivered:**

Project boundary shapefile	<i>SEM_Acquisition</i>	[comment]
Communities to be acquired	<i>Wayne County</i>	[comment]
Square Mileage from boundary shapefile	640 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	NA	[comment]
Resolution	6"	6" to be resampled to 12" for delivery to NGA
County wide compressed mosaic (includes City/Township mosaics)	Yes	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
UofM Biological Station**

**Products to be Delivered:**

Project boundary shapefile	<i>LiDAR_AOI_UMBS</i>	[comment]
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Communities to be acquired	<i>Cheboygan County (part)</i>	[comment]
Square Mileage from boundary shapefile	30.5 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided
<b>IMAGERY</b>		
Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>[coordinate system]</i>	[comment]
Resolution	<i>NA</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>NA</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>NA</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>NA</i>	If No, partner to provide custom tile grid
<b>LIDAR</b>		
Quality Level	<i>QL 2</i>	[comment]
Base Product	<i>Yes</i>	[comment]
Classified Point Cloud (Option 1)	<i>Yes</i>	[comment]
Bare Earth Surface (Option 2)	<i>No</i>	[comment]
Hydro-Flattened Bare Earth (Option 3)	<i>No</i>	[comment]
Hydro Enforcement (Option 4)	<i>No</i>	[comment]
Intensity Images (Option 5)	<i>No</i>	[comment]

**PRODUCT SCHEDULE**  
**Detroit CBD True-Ortho (Wayne County)**

**Products to be Delivered:**

Project boundary shapefile	<i>Detroit_CBD</i>	[comment]
Communities to be acquired	<i>Detroit Central Business District, Wayne County</i>	[comment]
Square Mileage from boundary shapefile	2 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane, south zone, FIPS 2113, North American Datum 1983(HARN), International feet	Note unique DATUM
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>6"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>NA</i>	
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]

Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid
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**PRODUCT SCHEDULE  
NORTH 12 INCH COUNTIES**

**Products to be Delivered:**

Project boundary shapefile	<i>North_12in_buffer</i>	[comment]
Communities to be acquired	<i>Ionia, Shiawassee, Lapeer counties</i>	[comment]
Square Mileage from boundary shapefile	<i>1828 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]
Resolution	<i>12"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>No</i>	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>Yes</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>Yes</i>	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
SOUTH 12 INCH COUNTIES**

**Products to be Delivered:**

Project boundary shapefile	<i>South_12in_buffer</i>	[comment]
Communities to be acquired	<i>Van Buren, Cass, Calhoun, Jackson, Lenawee counties</i>	[comment]
Square Mileage from boundary shapefile	<i>3380 Square Miles</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>NA</i>	[comment]

Resolution	12"	[comment]
County wide compressed mosaic (includes City/Township mosaics)	No	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
BATTLE CREEK (Calhoun County)**

**Products to be Delivered:**

Project boundary shapefile	<i>Battle_Creek_2015_AOI</i>	[comment]
Communities to be acquired	<i>Battle Creek</i>	[comment]
Square Mileage from boundary shapefile	107 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	<i>[coordinate system]</i>	[comment]
Resolution	12" & 6"	[comment]
County wide compressed mosaic (includes City/Township mosaics)	Yes	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	Yes	[comment]
Confirm standard 5,000' x 5,000 tile grid	Yes	If No, partner to provide custom tile grid

**PRODUCT SCHEDULE  
Anticipated additional imagery products**

**Products to be Delivered:**

Project boundary shapefile	<i>TBD Dependent on State and Local needs</i>	[comment]
Communities to be acquired	<i>TBD Dependent on State and Local needs</i>	[comment]
Square Mileage from boundary shapefile	<i>TBD Dependent on State and Local needs</i>	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American	[comment]
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	Datum 1983(1986), International feet	
Additional Coordinate System	<i>[coordinate system]</i>	[comment]
Resolution	<i>12", 6", 3"</i>	[comment]
County wide compressed mosaic (includes City/Township mosaics)	<i>TBD Dependent on State and Local needs</i>	Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	<i>TBD Dependent on State and Local needs</i>	[comment]
Confirm standard 5,000' x 5,000 tile grid	<i>TBD Dependent on State and Local needs</i>	If No, partner to provide custom tile grid

**Insert Pricing Table Here:**

2015 AOI	Cost
Project Total	\$1,354,349.43

**ACCEPTANCE CRITERIA:**

Deliverables will be reviewed and checked for quality at CSS before accepted.

**PROJECT CONTROL AND REPORTS:**

This is a deliverables based contract.

**PAYMENT SCHEDULE:**

Payment will be made upon receipt of products listed under deliverables section.

**EXPENSES:**

**Only expenses outlined in the deliverables table will be paid.**

**PROJECT CONTACT:**

Everett Root  
DTMB, Center for Shared Solutions  
G.W. Romney Building, 10<sup>th</sup> Floor  
111 S. Capitol Ave.  
Lansing, MI 48913  
517-373-7910  
[roote@michigan.gov](mailto:roote@michigan.gov)

**AGENCY RESPONSIBILITIES:**

Reserved



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 1935 Jamboree Drive  
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 Colorado Springs, CO 80920

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 www.sanborn.com

March 9, 2015

Mr. Everett Root  
 Outreach Specialist  
 Office of Technology Partnerships  
 Department of Technology, Management and Budget  
 State of Michigan  
 111 S. Capitol Ave., 10th Floor Romney  
 Lansing, MI 48933

Re: Quotation for 2015 MISAIL Program Imagery

Dear Mr. Root:

The Sanborn Map Company, Inc. (Sanborn) is pleased to continue our partnership with the State of Michigan in the MISAIL program in Flight Year 2015. We are submitting our quotation for this, the third year of performance, in response to the statement of requirements you have provided, and in keeping with all provisions of the contract governing this program. A table with a scope and fee summary is provided below for each project partner or collection area.

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
CLINTON (partner)	512	\$32.50	\$16,640.00	12-inch Base w/17.7% Discount Applied
	574	\$77.32	\$44,381.68	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>CLINTON SUBTOTAL</b>			<b>\$62,221.68</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
EATON (partner)	548	\$32.50	\$17,810.00	12-inch Base w/17.7% Discount Applied
	579	\$77.32	\$44,768.28	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>EATON SUBTOTAL</b>			<b>\$63,778.28</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
INGHAM (partner)	471	\$32.50	\$15,307.50	12-inch Base w/17.7% Discount Applied
	471	\$77.32	\$36,417.72	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>INGHAM SUBTOTAL</b>			<b>\$52,925.22</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
TRICOUNTY 3-inch BUYUP (partner)	205	\$32.50	\$6,662.50	12-inch Base w/17.7% Discount Applied
	205	\$238.36	\$48,863.80	3-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$8,431.00	Lansing True Ortho
			\$400.00	Compressed Mosaics
<b>TRICOUNTY 3-inch BUYUP SUBTOTAL</b>			<b>\$64,357.30</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
DELHI TOWNSHIP LiDAR (partner)	29.5	\$575.75	\$16,984.75	LIDAR Base at QL1
	29.5	\$62.16	\$1,833.78	Option 1 Classified Point Cloud QL1
	29.5	\$13.97	\$412.12	Option 2 Bare Earth Surface QL1
	29.5	\$10.06	\$296.77	Option 3 Hydro Flattened Bare Earth QL1
	29.5	\$63.96	\$1,886.82	Option 4 Hydro Enforcement QL1
<b>DELHI TOWNSHIP LiDAR SUBTOTAL</b>			<b>\$21,414.24</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
ST JOHNS 3-inch BUYUP (partner)	10	\$353.93	\$3,539.30	3-inch Buyup
<b>ST JOHNS 3-inch BUYUP SUBTOTAL</b>			<b>\$3,539.30</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
GENESEE (partner)	663	\$32.50	\$21,547.50	12-inch Base w/17.7% Discount Applied
<b>GENESEE SUBTOTAL</b>			<b>\$21,547.50</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
HILLSDALE (partner)	632	\$32.50	\$20,540.00	12-inch Base w/17.7% Discount Applied
	13.6	\$151.44	\$2,059.58	6-inch Buyup - Hillsdale City
	10.6	\$151.44	\$1,605.26	6-inch Buyup - Litchfield City
	10.5	\$151.44	\$1,590.12	6-inch Buyup - Somerset Twp
			\$400.00	Compressed Mosaics
<b>HILLSDALE SUBTOTAL</b>			<b>\$26,194.97</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
LEXINGTON/WORTH TWP (partner)	80	\$32.50	\$2,600.00	12-inch Base w/17.7% Discount Applied
<b>LEXINGTON/WORTH TWP SUBTOTAL</b>			<b>\$2,600.00</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
ST JOSEPH (partner)	535	\$32.50	\$17,387.50	12-inch Base w/17.7% Discount Applied
	70	\$151.44	\$10,600.80	6-inch Buyup - Sturgis City
			\$400.00	Compressed Mosaics
<b>ST JOSEPH SUBTOTAL</b>			<b>\$28,388.30</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
LIVINGSTON (partner)	559	\$32.50	\$18,167.50	12-inch Base w/17.7% Discount Applied
	559	\$77.32	\$43,221.88	6-inch buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>LIVINGSTON SUBTOTAL</b>			<b>\$62,589.38</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
HARTLAND TWP 3-inch BUYUP (partner)	40	\$32.50	\$1,300.00	12-inch Base w/17.7% Discount Applied
	40	\$353.93	\$14,157.20	3-inch Buyup
<b>HARTLAND 3-inch BUYUP SUBTOTAL</b>			<b>\$15,457.20</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
MACOMB (partner)	538	\$32.50	\$17,485.00	12-inch Base w/17.7% Discount Applied
	538	\$221.66	\$119,253.08	3-inch buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>MACOMB SUBTOTAL</b>			<b>\$137,938.08</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
MONROE (partner)	609	\$32.50	\$19,792.50	12-inch Base w/17.7% Discount Applied
	609	\$77.32	\$47,087.88	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>MONROE SUBTOTAL</b>			<b>\$68,080.38</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
OAKLAND (partner)	909	\$32.50	\$29,542.50	12-inch Base w/17.7% Discount Applied
	909	\$77.32	\$70,283.88	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>OAKLAND SUBTOTAL</b>			<b>\$101,026.38</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
ST CLAIR (partner)	774	\$32.50	\$25,155.00	12-inch Base w/17.7% Discount Applied
	204	\$94.08	\$19,192.32	6-inch Buyup
	55	\$359.14	\$19,752.70	3-inch Buyup
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>ST CLAIR SUBTOTAL</b>			<b>\$65,300.02</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
WASHTENAW (partner)	744	\$32.50	\$24,180.00	12-inch Base w/17.7% Discount Applied
	744	\$77.32	\$57,526.08	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>WASHTENAW SUBTOTAL</b>			<b>\$82,906.08</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
WAYNE (partner)	640	\$32.50	\$20,800.00	12-inch Base w/17.7% Discount Applied
	640	\$77.32	\$49,484.80	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
			\$800.00	12-inch Resampled for NGA
			\$400.00	Compressed Mosaics
<b>WAYNE SUBTOTAL</b>			<b>\$71,484.80</b>	
<b>Detroit CBD True Ortho</b>			<b>\$15,730</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
North 12-inch Counties: Ionia, Shiawassee, Lapeer	1828	\$32.50	\$59,410.00	12-inch Base w/17.7% Discount Applied
<b>North 12-inch Counties SUBTOTAL</b>			<b>\$59,410.00</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
South 12-inch Counties: Cass, Calhoun, Jackson, Lenawee, Van Buren	3380	\$32.50	\$109,850.00	12-inch Base w/17.7% Discount Applied
<b>South 12-inch Counties SUBTOTAL</b>			<b>\$109,850.00</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
BATTLE CREEK CITY (partner)	107	\$32.50	\$3,477.50	12-inch Base w/17.7% Discount Applied
	107	\$94.08	\$10,066.56	6-inch Buyup w/\$5.21 6-inch Contiguity Discount
<b>BATTLE CREEK CITY SUBTOTAL</b>			<b>\$13,544.06</b>	

AOI - SOM costs	SQ MILES	COST/SQ MILE	TOTAL COST	COMMENT
U of M Bio Station LiDAR(partner)	30.5	\$107.19	\$3,269.30	LIDAR Base at QL2
	30.5	\$26.13	\$796.97	Option 1 Classified Point Cloud QL2
<b>U of M Bio Station LiDAR SUBTOTAL</b>			<b>\$4,066.26</b>	

The total fee for all products and services quoted above is **\$1,154,349.43**.

We believe that this document has addressed all of your requirements. However, should you have questions or need clarification on any matter, please contact Mr. Brad Arshat, Director, Strategic Accounts, via phone: 443-603-7725, fax: 719-528-5093, or email: [barshat@sanborn.com](mailto:barshat@sanborn.com). We appreciate the opportunity to submit this quotation and look forward to hearing from you.

Sincerely,



John R. Copple

President/CEO

STATE OF MICHIGAN  
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
 PROCUREMENT  
 P.O. BOX 30026, LANSING, MI 48909  
 OR  
 530 W. ALLEGAN, LANSING, MI 48933

**CHANGE NOTICE NO. 1**  
 to  
**CONTRACT NO. 071B3200070**  
 between  
**THE STATE OF MICHIGAN**  
 and

NAME & ADDRESS OF CONTRACTOR:	PRIMARY CONTACT	EMAIL
The Sanborn Map Company, Inc. 1935 Jamboree Dr. , Suite 100 Colorado Springs, CO 80920	Brad Arshat	<a href="mailto:barshat@sanborn.com">barshat@sanborn.com</a>
	TELEPHONE	CONTRACTOR #, MAIL CODE
	(443) 603-7725	

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
CONTRACT COMPLIANCE INSPECTOR:	DTMB	Rob Surber	517-335-2820	<a href="mailto:surberr@michigan.gov">surberr@michigan.gov</a>
BUYER:	DTMB	Christine Mitchell	517-284-7020	<a href="mailto:mitchellc4@michigan.gov">mitchellc4@michigan.gov</a>

**CONTRACT SUMMARY:**

DESCRIPTION: <b>Aerial Imagery (Orthophotography) Services</b>			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION DATE	AVAILABLE OPTIONS
3 Years	February 7, 2013	February 6, 2016	2, 1 Year Options
PAYMENT TERMS	F.O.B	SHIPPED	SHIPPED FROM
N/A	N/A	N/A	N/A
ALTERNATE PAYMENT OPTIONS:			AVAILABLE TO MiDEAL PARTICIPANTS
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
MINIMUM DELIVERY REQUIREMENTS:			
N/A			

**DESCRIPTION OF CHANGE NOTICE:**

EXTEND CONTRACT EXPIRATION DATE	EXERCISE CONTRACT OPTION YEAR(S)	EXTENSION BEYOND CONTRACT OPTION YEARS	LENGTH OF OPTION/EXTENSION	EXPIRATION DATE AFTER CHANGE
<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/>		February 6, 2016

<b>COST OF CHANGE NOTICE:</b>	<b>ESTIMATED REVISED AGGREGATE CONTRACT VALUE:</b>
<b>\$70,718.67</b>	<b>\$1,638,225.67</b>

Effective 12/30/2014, Contract value is hereby increased by \$70,718.67 to provide adequate funds for the attached Statement of Work and pricing schedule incorporating the USACE project and the Allegan, Berrien, Van Buren County grouping. This is allowable per the existing contract terms. All other terms, conditions, current pricing and specifications remain the same.



**Michigan Statements of Work – December 3, 2014  
PRODUCT SCHEDULE**

**Products to be Delivered: Mecosta County USACE project**

Project boundary shapefile	<i>Muskegon River Mecosta co.KMZ</i>	[comment]
Communities to be acquired	<i>[County name or city/township/village]</i>	[comment]
Square Mileage from boundary shapefile	15.12 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]
Resolution	NA	[comment]
County wide compressed mosaic (includes City/Township mosaics)	NA	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	NA	[comment]
Confirm standard 5,000' x 5,000 tile grid	NA	If No, partner to provide custom tile grid

**LIDAR**

Quality Level	QL 2	[comment]
Base Product	Yes	[comment]
Classified Point Cloud (Option 1)	Yes	[comment]
Bare Earth Surface (Option 2)	Yes	[comment]
Hydro-Flattened Bare Earth (Option 3)	Yes	[comment]
Hydro Enforcement (Option 4)	Yes	[comment]
Intensity Images (Option 5)	Yes	[comment]

**Insert Pricing Table Here:**

<b>Mecosta County USACE project AOI</b>	<b>Cost</b>
Project Total	\$5,536.79

**Products to be Delivered: Allegan, Berrien, Van Buren County Grouping project**

Project boundary shapefile	<i>SW_MI_AOI_2015_lidar.shp</i>	[comment]
Communities to be acquired	<i>Allegan, Berrien, and Van Buren counties</i>	[comment]
Square Mileage from boundary shapefile	2061 Square Miles	** Data will be <b>clipped</b> to the boundary shapefile provided

**IMAGERY**

Coordinate System	MI State Plane (appropriate zone), North American Datum 1983(1986), International feet	[comment]
Additional Coordinate System	NA	[comment]

Resolution	NA	[comment]
County wide compressed mosaic (includes City/Township mosaics)	NA	<b>\$400 option</b> Default is MrSID at 20:1 compression
Confirm delivery of all 4 bands (R, G, B, NIR)	NA	[comment]
Confirm standard 5,000' x 5,0000 tile grid	NA	If No, partner to provide custom tile grid
<b>LIDAR</b>		
Quality Level	QL 2	[comment]
Base Product	Yes	[comment]
Classified Point Cloud (Option 1)	Yes	[comment]
Bare Earth Surface (Option 2)	Yes	[comment]
Hydro-Flattened Bare Earth (Option 3)	Yes	[comment]
Hydro Enforcement (Option 4)	No	[comment]
Intensity Images (Option 5)	Yes	[comment]

**Insert Pricing Table Here:**

<b>Allegan, Berrien, Van Buren County Grouping AOI</b>	<b>Cost</b>
Project Total	\$324,298.35

The Sanborn Map Company, Inc.  
 1935 Jamboree Drive, Suite 100  
 Colorado Springs, CO 80920  
 Attn: Brad Arshat, Contract Manager  
 443-603-7725  
 barshat@sanborn.com

State of Michigan Contract #: 071B3200070  
 Date of Quote: 12/8/2014

<b>Muskegon River, Mecosta Co USACE project</b>			
<b>Product</b>	<b>Square Mileage</b>	<b>Price Per Square Mile Base</b>	<b>Base Total</b>
Lidar Base QL2 (Sanborn Base Product)	15.12	\$248.17	\$3,752.33
Classified Point Cloud QL2 (Sanborn Option 1)	15.12	\$30.03	\$454.05
Bare Earth Surface QL2 (Sanborn Option 2)	15.12	\$13.97	\$211.23
Hydro-Flattened Bare Earth (Sanborn Option 3)	15.12	\$10.06	\$152.11
Option for Hydro-Enforcement (Sanborn Option 4)	15.12	\$63.96	\$967.08
Option 5 (intensity images; no cost)	15.12	\$0.00	\$0.00
<b>LiDAR Total</b>			<b>\$5,536.79</b>
<b>Allegan, Berrien, Van Buren County Grouping</b>			
<b>Product</b>	<b>Square Mileage</b>	<b>Price Per Square Mile Base 1001-5000 Sq Miles</b>	<b>Base Total</b>
Lidar Base QL2 (Sanborn Base Product)	2061	\$107.19	\$220,918.59
Classified Point Cloud QL2 (Sanborn Option 1)	2061	\$26.13	\$53,853.93
Bare Earth Surface QL2 (Sanborn Option 2)	2061	\$13.97	\$28,792.17
Hydro-Flattened Bare Earth (Sanborn Option 3)	2061	\$10.06	\$20,733.66
<b>LiDAR Total</b>			<b>\$324,298.35</b>
<b>SOM TOTAL</b>			<b>\$329,835.14</b>

STATE OF MICHIGAN  
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
 PROCUREMENT  
 P.O. BOX 30026, LANSING, MI 48909  
 OR  
 530 W. ALLEGAN, LANSING, MI 48933

February 4, 2013

**CONTRACT NO. 071B3200070**  
 between  
**THE STATE OF MICHIGAN**  
 and

NAME & ADDRESS OF CONTRACTOR:	PRIMARY CONTACT	EMAIL
The Sanborn Map Company, Inc. 1935 Jamboree Dr. , Suite 100 Colorado Springs, CO 80920	Brad Arshat	<a href="mailto:barshat@sanborn.com">barshat@sanborn.com</a>
	TELEPHONE	CONTRACTOR #, MAIL CODE
	(443) 603-7725	

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
CONTRACT COMPLIANCE INSPECTOR:	DTMB	Rob Surber	517-335-2820	<a href="mailto:surberr@michigan.gov">surberr@michigan.gov</a>
BUYER:	DTMB	Reid Sisson	517-241-1638	<a href="mailto:sissonr@michigan.gov">sissonr@michigan.gov</a>

CONTRACT SUMMARY:			
DESCRIPTION: <b>Aerial Imagery (Orthophotography) Services</b>			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION DATE	AVAILABLE OPTIONS
<b>3 Years</b>	<b>February 7, 2013</b>	<b>February 6, 2016</b>	<b>2, 1 Year Options</b>
PAYMENT TERMS	F.O.B	SHIPPED	SHIPPED FROM
<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
ALTERNATE PAYMENT OPTIONS:			AVAILABLE TO MiDEAL PARTICIPANTS
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
MINIMUM DELIVERY REQUIREMENTS:			
<b>N/A</b>			
MISCELLANEOUS INFORMATION:			
<b>The terms and conditions of this Contract are those of solicitation # 084R3200004 and this Contract Agreement. In the event of any conflicts between the specifications, and terms and conditions, indicated by the State and those indicated by the vendor, those of the State take precedence.</b>			
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION:			<b>\$1,567,507.00</b>

STATE OF MICHIGAN  
 DEPARTMENT OF TECHNOLOGY, MANAGEMENT AND BUDGET  
 PROCUREMENT  
 P.O. BOX 30026, LANSING, MI 48909  
 OR  
 530 W. ALLEGAN, LANSING, MI 48933

**CONTRACT NO. 071B3200070**  
 between  
**THE STATE OF MICHIGAN**  
 and

NAME & ADDRESS OF CONTRACTOR:	PRIMARY CONTACT	EMAIL
The Sanborn Map Company, Inc. 1935 Jamboree Dr. , Suite 100 Colorado Springs, CO 80920	Brad Arshat	<a href="mailto:barshat@sanborn.com">barshat@sanborn.com</a>
	TELEPHONE	CONTRACTOR #, MAIL CODE
	(443) 603-7725	

STATE CONTACTS	AGENCY	NAME	PHONE	EMAIL
CONTRACT COMPLIANCE INSPECTOR:	DTMB	Rob Surber	517-335-2820	<a href="mailto:surberr@michigan.gov">surberr@michigan.gov</a>
BUYER:	DTMB	Reid Sisson	517-241-1638	<a href="mailto:sissonr@michigan.gov">sissonr@michigan.gov</a>

CONTRACT SUMMARY:			
DESCRIPTION: Aerial Imagery (Orthophotography) Services			
INITIAL TERM	EFFECTIVE DATE	INITIAL EXPIRATION DATE	AVAILABLE OPTIONS
3 Years	February 7, 2013	February 6, 2016	2, 1 Year Options
PAYMENT TERMS	F.O.B	SHIPPED	SHIPPED FROM
N/A	N/A	N/A	N/A
ALTERNATE PAYMENT OPTIONS:			AVAILABLE TO MiDEAL PARTICIPANTS
<input type="checkbox"/> P-card <input type="checkbox"/> Direct Voucher (DV) <input type="checkbox"/> Other			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
MINIMUM DELIVERY REQUIREMENTS:			
N/A			
MISCELLANEOUS INFORMATION:			
<b>The terms and conditions of this Contract are those of solicitation # 084R3200004 and this Contract Agreement. In the event of any conflicts between the specifications, and terms and conditions, indicated by the State and those indicated by the vendor, those of the State take precedence.</b>			
ESTIMATED CONTRACT VALUE AT TIME OF EXECUTION:			\$1,567,507.00

**THIS IS NOT AN ORDER:** This Contract Agreement is awarded on the basis of our inquiry bearing the solicitation # 084R3200004. Orders for delivery will be issued directly by the Department of Technology, Management & Budget through the issuance of a Purchase Order Form.

---

---

**FOR THE CONTRACTOR:**

---

Firm Name

---

Authorized Agent Signature

---

Authorized Agent (Print or Type)

---

Date

---

---

**FOR THE STATE:**

---

Signature

**Greg Faremouth, IT Director**

---

Name/Title

---

**DTMB Procurement**

---

Enter Name of Agency

---

Date



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**Article 1 – Statement of Work (SOW)**

**1.000 Project Identification**

**1.001 PROJECT REQUEST**

The State of Michigan, Department of Technology, Management and Budget – Office of State Procurement, in partnership with the Center for Shared Solutions (CSS) (collectively known as the State) have issued this Contract to procure consistent high resolution statewide digital ortho-imagery, LiDAR acquisition and products, and a data hosting solution. The State wishes to award one three-year contract resulting from the Contract.

The goal of this Contract is to:

1. Continue to add to the SOM repository of high resolution ortho-imagery acquired during the period of 2004-2012.
2. Create an avenue for State, Local, and Federal government entities to acquire high quality imagery and LiDAR data.
3. Create a data hosting environment to efficiently manage and serve the large amounts of data now available and future data to be collected. This environment must be scalable to support all levels of government within Michigan.

The State will evaluate received proposals in response to this Contract. Once evaluations are complete, the State will be in a position to determine the best course of action for award. Alliances among suppliers are acceptable to meet the requirements of this procurement, through a Prime Contractor – Subcontractor(s) relationship. However, the State requires a Single Point of Contact for all business conducted with the State. The State encourages suppliers to bring innovative ideas and/or solutions to government—ideas that result in cost and operational efficiencies or improvements while enhancing the services that governments provide its citizens.

**1.002 BACKGROUND**

Since 2004, the State Of Michigan has been working to acquire high resolution ortho photography to assist in the geo-spatial data needs of State employees and to provide high quality images as a backdrop for State Of Michigan internet applications that contain a mapping component.

During the last 8 years, a variety of State, Local, and Federal partnership initiatives have been put in place that have increased the availability of high resolution ortho-imagery and increased the desire to continue to add to the available data.

Access to good ortho-imagery has created a demand for more data at better resolution collected in a timely manner. This next generation ortho-imagery program that will result from the issuance of this Contract will be a major step toward reaching SOM goals. It is the SOM's intent to acquire ortho-imagery for approximately 20% of the State each year over the next 5 years. It is also the SOM's intent to extend the services and pricing established through this Contract to State Partners, which may include, but not be limited to, Local and Federal Government entities. It is also the SOM's intent to add to the availability of high quality data by adding the ability to acquire Lidar data and a data storage service.



**1.100 Scope of Work and Deliverables**

**1.101 IN SCOPE**

Allowable services consist of the following scope:

- Contractor will provide aerial flyover services to provide ortho-imagery and associated products
- At the State’s option, Contractor will provide Light-Detection and Ranging (LIDAR) and associated products
- At the State’s option, Contractor will provide Data as a Service to the State, which will include:
  - Project Management
  - Solution Requirements Validation
  - Solution Design and Configuration
  - Data Conversion and Import
  - Acceptance Testing
  - Production
  - Hosting
  - Solution Help Desk Support

Services under this Contract will be engaged by the following process:

1. The State will issue an individual Statement of Work (SOW) to the Contractor, defining the Project and its specific requirements.
2. Within ten business days of receipt of the SOW, and in response to the SOW, Contractor will submit a Task Proposal to meet SOW’s requirements, including cost.
3. The State may seek revisions to the Contractor’s Task Proposal by issuing a revised SOW, to which the Contractor will respond with a revised Task Proposal within ten business days.
4. The State will approve and execute the Project through issue of a Purchase Order referencing the SOW and Task Proposal.

**A more detailed description of the services (work) and deliverables sought for this project is provided in Article 1, Section 1.104, Work and Deliverables.**

The State reserves the right to increase Contract spending authority and to add Additional Services and Deliverables, based on its sole assessment of best value.

**1.102 OUT OF SCOPE**

Hardware and software shall be considered out of scope for this contract. Any Service or Deliverable that does not relate to ortho-imagery, LIDAR, or Data as a Service shall be considered out of scope.



**1.103 ENVIRONMENT**

The links below provide information on the State’s Enterprise information technology (IT) policies, standards and procedures which includes security policy and procedures, IT strategic plan, eMichigan web development and the State Unified Information Technology Environment (SUITE).

Contractors are advised that the State has methods, policies, standards and procedures that have been developed over the years. Contractors are expected to provide proposals that conform to State IT policies and standards. All services and products provided as a result of this Contract must comply with all applicable State IT policies and standards. Contractor is required to review all applicable links provided below and state compliance in their response.

**A. Enterprise IT Policies, Standards and Procedures:**

<http://www.michigan.gov/dmb/0,1607,7-150-56355-107739--,00.html>

All software and hardware items provided by the Contractor must run on and be compatible with the MDTMB Standard Information Technology Environment. Additionally, the State must be able to maintain software and other items produced as the result of the Contract. Therefore, non-standard development tools may not be used unless approved by MDTMB. The Contractor must request, in writing, approval to use non-standard software development tools, providing justification for the requested change and all costs associated with any change. The MDTMB Project Manager must approve any tools, in writing, before use on any information technology project.

It is recognized that technology changes rapidly. The Contractor may request, in writing, a change in the standard environment, providing justification for the requested change and all costs associated with any change. The State’s Project Manager must approve any changes, in writing, and MDTMB, before work may proceed based on the changed environment.

**Enterprise IT Security Policy and Procedures:**

- [http://www.michigan.gov/documents/dmb/1310\\_183772\\_7.pdf](http://www.michigan.gov/documents/dmb/1310_183772_7.pdf)
- [http://www.michigan.gov/documents/dmb/1310.02\\_183775\\_7.pdf](http://www.michigan.gov/documents/dmb/1310.02_183775_7.pdf)
- [http://www.michigan.gov/documents/dmb/1325\\_193160\\_7.pdf](http://www.michigan.gov/documents/dmb/1325_193160_7.pdf)
- [http://www.michigan.gov/documents/dmb/1335\\_193161\\_7.pdf](http://www.michigan.gov/documents/dmb/1335_193161_7.pdf)
- [http://www.michigan.gov/documents/dmb/1340\\_193162\\_7.pdf](http://www.michigan.gov/documents/dmb/1340_193162_7.pdf)
- [http://www.michigan.gov/documents/dmb/1350.10\\_184594\\_7.pdf](http://www.michigan.gov/documents/dmb/1350.10_184594_7.pdf)

All State and contractual employees are required to have an application level login and password to access system functions. Any contract employee that accesses the system functions must adhere to all State security policies. For example each contract employee must use his/her individual account with password-no shared accounts or passwords, authorizations with least privileges based on need-to-know basis.

In the event the Contractor or an individual representing the Contractor is granted access to State IT resources, this individual acknowledges and agrees to the State’s acceptable use policy;

[http://www.michigan.gov/documents/dmb/1460.00\\_184733\\_7.pdf](http://www.michigan.gov/documents/dmb/1460.00_184733_7.pdf)



**The State’s security environment includes:**

- MDTMB Single Login.
- MDTMB provided SQL security database.
- Secured Socket Layers.
- SecureID (State Security Standard for external network access and high risk Web systems)

**IT Strategic Plan:**

<http://www.michigan.gov/itstrategicplan>

**B. The State Unified Information Technology Environment (SUITE):**

Includes standards for project management, systems engineering, and associated forms and templates – must be followed as applicable: <http://www.michigan.gov/suite>

**C. Agency Specific Technical Environment**

GeoTiff Specification, version 1.8.2, found at:

<http://www.remotesensing.org/geotiff/spec/geotiffhome.html>

Web Map Service (WMS) specification found at: <http://www.opengeospatial.org/standards/wms>

Web Coverage Service (WCS) specification found at: <http://www.opengeospatial.org/standards/wcs>

Web Feature Service (WFS) specifications found at: <http://www.opengeospatial.org/standards/wfs>

Software Products Used by the State and Partners:

- JP2 - <http://www.jpeg.org/jpeg2000/index.html>
- ESRI ArcGIS Server V9.x and 10.x
- ESRI ArcGIS Desktop V9.x and 10.x
- Oracle Database and Spatial Option
- Bentley MicroStation V7x and 8x
- Caliper TransCAD and Maptitude
- PitneyBowes MapInfo
- Microsoft SQL

**1.104 Work And Deliverable**

The State desires to establish the Contract to provide the base high-resolution and higher-resolution ortho-imagery for the State at large, as well as establish a “cafeteria style” selection of related and optional products that can be utilized by the SOM and designated partners. These options are important to the State’s partners and, therefore, the State expects the options to meet the high-quality standards that our partners expect.



**I. Services and Deliverables To Be Provided**

For the purpose of preparing proposals, Contractor should contemplate they must be ready to fly and begin ortho-imagery acquisition by March 1, 2013. These deliverables are not all inclusive. Contractors may propose other deliverables.

**A. Ortho-imagery Acquisition and Data**

At the State’s request, and as defined in an individual Project, Contractor will provide, and do all things necessary to provide, ortho-imagery services and data. The purpose of these imagery services will be to provide the Data and Imaging Products described in Section A below. Contractor will provide the services in accordance with the Contract’s requirements, and also in accordance with any specified requirements within the Project. Individual Projects will vary, based on the specific needs of the State and its partners, and at the State’s sole determination. Without making any binding commitment to purchase the services, the State expects to schedule ortho-imagery acquisition of 20% of State’s area per year, during leaf-off conditions. Additionally, the State anticipates a potential need for ad-hoc ortho-imagery projects.

Contractor will provide fully supported project management and scheduling services, compatible with the State’s Project Management Methodology (See 1.103, B). Tasks will be identified within the project’s Statement of Work, but at a minimum Contractor will complete the following, not limited to:

- Project Management and Scheduling
- Communications
- Risk Management
- Aerial Flyover Services for Ortho-Imagery Acquisition

Specific types of Data to be provided will be determined within the Project, Details of the Data to be provided are listed in Attachment A – Imagery Specifications.

The State will receive an unlimited, irrevocable license to use the Data. Authorized State Partners may purchase the Data, in which case the State will coordinate and handle the purchase. In the case of a Partner acquiring the Data, the Partner becomes the legal distributor of the Data and may provide the Data to other parties, based on their policies. Only an authorized Partner of the State may acquire the Data. The State reserves the sole right to determine and identify Partners.

**Deliverables and Acceptance Criteria**

Contractor will provide deliverables as identified in the Project. All Data provided under the Contract shall be considered a deliverable of the specific Project’s Statement of Work and shall be subject to the State’s review and acceptance, based on the Requirements.



**B. Lidar Acquisition and Data**

As an option under this contract and at the State’s request as defined in an individual Project, Contractor will provide, and do all things necessary to provide, Lidar services and data. The purpose of these Lidar services will be to provide the Data and Lidar Products described in Section B below. Contractor will provide the services in accordance with the Contract’s requirements, and also in accordance with any specified requirements within the Project. Individual Projects will vary, based on the specific needs of the State and its partners, and at the State’s sole determination. Without making any binding commitment to purchase the services, the State anticipates a potential need for ad-hoc Lidar projects.

Contractor will provide fully supported project management and scheduling services, compatible with the State’s Project Management Methodology (See 1.103, B). Tasks will be identified within the project’s Statement of Work, but at a minimum Contractor will complete the following, not limited to:

- o Project Management and Scheduling
- o Communications
- o Risk Management
- o Aerial Flyover Services for Ortho-Imagery Acquisition

Specific types of Data to be provided will be determined within the Project. Details of the Data to be provided are listed in Attachment B – Lidar Specifications.

The State will receive an unlimited, irrevocable license to use the LIDAR Data. Authorized State Partners may purchase the Data, in which case the State will coordinate and handle the purchase. In the case of a Partner acquiring the Data, the Partner becomes the legal distributor of the Data and may provide the Data to other parties, based on their policies. Only an authorized Partner of the State may acquire the Data. The State reserves the sole right to determine and identify Partners.

**Deliverables and Acceptance Criteria**

Contractor will provide deliverables as identified in the Project. All Data provided under the Contract shall be considered a deliverable of the specific Project’s Statement of Work and shall be subject to the State’s review and acceptance, based on the Requirements.

**C. Data As A Service, Hosting Implementation And Operations Services**

As an option under this Contract, the State may have the vendor host and provide access to Data as a Service (DaaS) for authorized users, as defined below, within Attachment C – Data as a Service Specifications. Subject to the State’s approval, Contractor will provide, and do all things necessary to provide, the following services for implementation and operation of an external Data Hosting Solution, including the following tasks:

1. Project Kickoff and Management: Contractor will initiate the Project in accord with the Contract’s terms, per Section 1.300 Project Plan. Contractor will manage the project in accordance with the State’s SUITE methodology (See 1.103, B).



2. Solution Requirements Validation Contractor will review the Solution Requirements detailed in Attachment C with State Subject Matter Experts, noting and addressing any risks or issues through formal change management processes with the Project Managers.
3. Solution Design and Configuration: Contractor will provide access to a managed and networked data hosting environment that can be configured to meet defined Service Level Agreements and security requirements. This will include documentation of all aspects of the solution architecture and configuration. As part of this the Contractor will include:
  - a. Identified Testing, and Production environments. This should also include a solution to provide a Development environment for future enhancements.
  - b. A disaster recovery plan for server hosting facilities and the system. A written description outlining this plan shall be provided and approved by the State
  - c. An Enterprise Architecture Solution Assessment (EASA), per Attachment F Contractor will be responsible for filling out the EASA, which will be subject to the State's review and approval.
  - d. An IT Security Assessment, per Attachment G Contractor will be responsible for filling out the IT Security Assessment, while the State will be responsible for gaining its approval. Contractor will be responsible for providing security remediation's, based on the Assessment.
4. Data Conversion and Import: Contractor will convert all hosted Data to file format accessible via Internet Protocol and install the Data in the hosting environment and complete initial testing to assure successful operation of all system components.
5. Acceptance Testing: Contractor will coordinate and schedule testing of the Hosting System and Data with the State's staff. The contractor will be responsible for documenting all system functional and performance errors and providing remediation. For planning purposes the Contractor should anticipate having access to up to three (3) State staff for up to an average of five hours each of their time. The State will also use this period to perform data-sampling to validate the accuracy of the Data. The State must accept this deliverable prior to any of the deliverables identified further below.
6. Production: upon successful completion of all prior deliverables, Contractor will provide the live Data to all authorized users, per #7 below. As part of this step Contractor will provide an initial Solution Warranty, in which Contractor will provide Maintenance, Technical, and Help Desk Support (see #8 below) at no additional charge to the State. Contractor will be responsible for logging,



reporting, and fixing any reported defects related to the system. This warranty period will not close if defects with a severity level of Critical or High are unresolved. For defects, the Contractor shall define the root cause of problems, recommend solutions and secure corrections. All system errors must be logged and fixed, and the Hosting Solution must run error-free for thirty days before the State will consider this deliverable accepted.

7. Hosting Operations: Per the defined requirements in Attachment C, Contractor will do all things necessary to operate DaaS and provide the service in a reliable and secure manner.
8. Solution Help Desk Support: The Contractor shall provide a toll-free help desk telephone number for reporting all system related issues, for which the Contractor shall bear the cost. There shall be no limit to the number of calls that can be placed to the help desk. The help desk shall be staffed adequately to handle all questions and complaints. Staffing hours dependent on System Availability chosen per Attachment C, Section 1.4.

Option #1: Monday – Friday, 8 AM – 5 PM EST  
 Option #2: 365/24/7

Call hold-times will not exceed three minutes. Answering machine service shall be available when help desk is not able to respond after three minutes of hold-time. All calls will be returned within 15 minutes. The Contractor shall staff the Help Desk with experienced personnel that can answer “how to” questions about the service. Merely answering the phone and assigning a case number to a problem does not meet this requirement.

Specific implementation requirements for DaaS are detailed in Attachment C Data as a Service Specifications. The proposed solution may consist of either physical and/or virtual servers.

The Solution must be hosted on hardware covered under manufacturer warranty.

To prevent security breaches, Contractor must update all necessary patches in a timely manner to all the software’s used to successfully run the Solution that will include but not limited to the Operating system, Database etc.

Hardware refreshes shall not impact system performance or user access.

**Acceptance Criteria**

All deliverables provided as services under this Section will be subject to the review and approval of the State’s identified project manager.



**1.200 Roles and Responsibilities**

**1.201 CONTRACTOR STAFF, ROLES, AND RESPONSIBILITIES**

**A. Contractor Staff**

The Contractor will provide sufficient staffing to provide the requested services and meet all requirements under this Contract. The Contractor shall be responsible for the continuous training of its staff.

Contractor must provide a list of all subcontractors, including firm name, address, contact person, and a complete description of the work to be contracted. Include descriptive information concerning subcontractor’s organization and abilities.

Single Point of Contact: The Contractor will identify a Single Point of Contact (SPOC). The duties of the SPOC shall include, but not be limited to:

- supporting the management of the Contract,
- facilitating dispute resolution, and
- advising the State of performance under the terms and conditions of the Contract.

The State reserves the right to require a change in the current SPOC if the assigned SPOC is not, in the opinion of the State, adequately serving the needs of the State.

The contractor must submit a letter of commitment for Key Personnel, signed by the identified resource, stating their commitment to work for the contractor/subcontractor on this project contingent on award of the bid. If the identified personnel are currently assigned to a State project the contractor must provide a letter signed by the State Project Manager releasing the individual from the project upon execution of the contract.

The Contractor will provide, and update when changed, an organizational chart indicating lines of authority for personnel involved in performance of this Contract and relationships of this staff to other programs or functions of the firm. This chart must also show lines of authority to the next senior level of management and indicate who within the firm will have prime responsibility and final authority for the work.

Key Personnel: Specific Key Personnel are identified here in the Contract. The State may identify other Key Personnel as part of individual Statements of Work. All Key Personnel may be subject to the State’s interview and approval process. Any key staff substitution must have the prior approval of the State. The State has identified the following as key personnel for this project:

- Project Manager: The Contractor will provide a project manager to interact with the designated personnel from the State to ensure an acceptable delivery of products and services. The project manager lead will coordinate all of the activities of the Contractor personnel assigned to the project and create all reports required by State. The Contractor's project manager responsibilities include, at a minimum:

Manage all defined Contractor responsibilities in this Scope of Services.  
Manage Contractor’s subcontractors, if any



- Develop the project plan and schedule, and update as needed
- Serve as the point person for all project issues
- Coordinate and oversee the day-to-day project activities of the project team
- Assess and report project feedback and status
- Escalate project issues, project risks, and other concerns
- Review all project deliverables and provide feedback
- Proactively propose options and alternatives for consideration
- Utilize change control procedures
- Prepare project documents and materials
- Manage and report on the project's budget

- Certified Photogrammetist: All production shall be under the supervision of an American Society of Photogrammetry and Remote Sensing (ASPRS) Certified Photogrammetrist. All products shall be reviewed and approved by an ASPRS Certified Photogrammetrist. The name of the supervising Certified Photogrammetrist shall be included in the metadata.
  - General Image Quality
  - Instrumental Corrections
  - Radiometric Correction
  - Spatial Correction
  - Mosaicking
  - Accuracy

The Contractor will provide sufficient qualified staffing to satisfy the deliverables of this Statement of Work.

**1. Travel:**

- a. No travel or expenses will be reimbursed. This includes travel costs related to training provided to the State by Contractor.
- b. Travel time will not be reimbursed.

**2. Additional Security and Background Check Requirements:**

At the State's request, Contractor must present certifications evidencing satisfactory Michigan State Police Background checks ICHAT and drug tests for all staff identified for assignment to this project.

In addition, proposed Contractor personnel will be required to complete and submit an RI-8 Fingerprint Card for the National Crime Information Center (NCIC) Finger Prints, if required by project.

Contractor will pay for all costs associated with ensuring their staff meets all requirements.

**1.202 STATE STAFF, ROLES, AND RESPONSIBILITIES**

The State will identify specific project managers and subject matter experts (SME's), along with their individual roles and responsibilities, as part of individual Projects.

**State Program Manager/Contract Compliance Inspector-**



MDTMB will provide a Program Manager/Contract Compliance Inspector who will be responsible for the State's infrastructure and coordinate with the Contractor in determining the system configuration.

The State's Program Manager/Con will provide the following services:

- Support management of the Contract
- Provide State facilities, as needed
- Coordinate the State resources necessary for the project
- Facilitate coordination between various external contractors
- Facilitate communication between different State departments/divisions
- Review and sign-off invoices
- Escalate outstanding/high priority issues
- Utilize change control procedures
- Conduct regular and ongoing review of the Contract to confirm that it meets objectives and requirements
- Document and archive all important Contract decisions

Name	Agency/Division	Title
Rob Surber	DTMB	Project Manager

**1.300 Project Plan**

**1.301 PROJECT PLAN MANAGEMENT**

**Project Plan**

As required by individual Projects, Contractor will provide a Project Work Breakdown Structure (WBS), including necessary time frames and deliverables for the various stages of the project and the responsibilities and obligations of both the Contractor and the State.

1. In particular, the WBS will include a MS Project plan or equivalent (check the SUITE/PMM standard):
  - a. A description of the deliverables to be provided under the Project.
  - b. Target dates and critical paths for the deliverables.
  - c. Identification of roles and responsibilities, including the organization responsible. Contractor is to provide a roles and responsibility matrix.
  - d. The labor, hardware, materials and supplies required to be provided by the State in meeting the target dates established in the WBS.
  - e. Internal milestones
  - f. Task durations
2. The WBS shall include the following deliverable/milestones for which payment shall be made:
  - a. Payment to the Contractor will be made upon the completion and acceptance of the deliverable or milestone, not to exceed contractual costs of the phase. A milestone is defined as complete when all of the deliverables within the milestone have been completed.
  - b. Failure to provide deliverable/milestone by the identified date may be subject to liquidated damages as identified in Article 2.



**Contract Orientation Meeting**

Upon 14 calendar days from execution of the Contract, the Contractor will be required to attend an orientation meeting to discuss the content and procedures of the Contract. The meeting will be held in Lansing, Michigan, at a date and time mutually acceptable to the State and the Contractor. The State shall bear no cost for the time and travel of the Contractor for attendance at the meeting.

**Performance Review Meetings**

The State may require the Contractor to attend meetings as needed, to review the Contractor’s performance under the Contract. The meetings will be held in Lansing, Michigan, or by teleconference, as mutually agreed by the State and the Contractor. The State shall bear no cost for the time and travel of the Contractor for attendance at the meeting.

**Project Control**

1. The Contractor will carry out projects under the direction and control of DTMB CSS.
2. In accord with individual Projects, the Contractor will submit to the State project manager(s) for final approval of the project plan. This project plan must be in agreement with Article 1, Section 1.104 Work and Deliverables, and must include the following:
  - The Contractor’s project organizational structure.
  - The Contractor’s staffing table with names and title of personnel assigned to the project. This must be in agreement with staffing of accepted proposal. Necessary substitutions due to change of employment status and other unforeseen circumstances may only be made with prior approval of the State.
  - The project work breakdown structure (WBS) showing sub-projects, activities and tasks, and resources required and allocated to each.
  - The time-phased plan in the form of a graphic display, showing each event, task, and decision point in the WBS.
3. The Contractor will manage the project in accordance with the State Project Management methodology or an approved equivalent. The State reserves the sole right to determine what it may deem an acceptable alternative. Contractor must propose any alternative.
  - a. Contractor will use an automated tool for planning, monitoring, and tracking the Contract’s progress and the level of effort of any Contractor personnel spent performing Services under the Contract. The tool shall have the capability to produce:
    - Staffing tables with names of personnel assigned to Project tasks.
    - Project plans showing tasks, subtasks, deliverables, and the resources required and allocated to each (including detailed plans for all Services to be performed within the next 30 calendar days, updated semi-monthly).
    - Updates must include actual time spent on each task and a revised estimate to complete.
    - Graphs showing critical events, dependencies and decision points during the course of the Contract.
  - b. Any tool(s) used by Contractor for such purposes must produce information of a type and in a manner and format that will support reporting in compliance with the State standards.



**1.302 REPORTS**

Reporting formats must be submitted to the State’s Project Manager for approval within 10 business days after the execution of the an Project. Once both parties have agreed to the format of the report, it shall become the standard to follow for the duration of the Project.

Reports will include:

- Project status
- Updated project plan
- Summary of activity during the report period
- Accomplishments during the report period
- Deliverable status
- Schedule status
- Action Item status
- Issues
- Change Control

**1.400 Project Management**

**1.401 ISSUE MANAGEMENT**

An issue is an identified event that if not addressed may affect schedule, scope, quality, or budget.

The Contractor shall maintain an issue log for issues relating to the provision of services under this Contract. The issue management log must be communicated to the State’s Project Manager on an agreed upon schedule, with email notifications and updates. The issue log must be updated and must contain the following minimum elements:

- Description of issue
- Issue identification date
- Responsibility for resolving issue.
- Priority for issue resolution (to be mutually agreed upon by the State and the Contractor)
- Resources assigned responsibility for resolution
- Resolution date
- Resolution description

Issues shall be escalated for resolution from level 1 through level 3, as defined below:

- Level 1 – Business leads
- Level 2 – Project Managers
- Level 3 – Executive Subject Matter Experts (SME’s)

**1.402 RISK MANAGEMENT**

A risk is an unknown circumstance or event that, if it occurs, may have a positive or negative impact on the project.



The Contractor is responsible for establishing a risk management plan and process, including the identification and recording of risk items, prioritization of risks, definition of mitigation strategies, monitoring of risk items, and periodic risk assessment reviews with the State.

A risk management plan format shall be submitted to the State for approval within twenty (20) business days after the effective date of the contract resulting from the upcoming Contract. The risk management plan will be developed during the initial planning phase of the project, and be in accordance with the State’s PMM methodology. Once both parties have agreed to the format of the plan, it shall become the standard to follow for the duration of the contract. The plan must be updated bi-weekly, or as agreed upon.

The Contractor shall provide the tool to track risks. The Contractor will work with the State and allow input into the prioritization of risks.

The Contractor is responsible for identification of risks for each phase of the project. Mitigating and/or eliminating assigned risks will be the responsibility of the Contractor. The State will assume the same responsibility for risks assigned to them.

**1.403 CHANGE MANAGEMENT**

Change management is defined as the process to communicate, assess, monitor, and control all changes to resources and processes. The State also employs change management in its administration of the Contract.

If a proposed change is approved by the Agency, the Contract Administrator will submit a request for change to the Department of Technology, Management and Budget, Procurement Buyer, who will make recommendations to the Director of DTMB-Procurement regarding ultimate approval/disapproval of change request. If the DTMB Procurement Director agrees with the proposed modification, and all required approvals are obtained (including State Administrative Board), the DTMB-Procurement Buyer will issue an addendum to the Contract, via a Contract Change Notice. **Contractors who provide products or services prior to the issuance of a Contract Change Notice by the DTMB-Procurement, risk non-payment for the out-of-scope/pricing products and/or services.**

The Contractor must employ change management procedures to handle such things as “out-of-scope” requests or changing business needs of the State while the migration is underway.

The Contractor will employ the change control methodologies to justify changes in the processing environment, and to ensure those changes will not adversely affect performance or availability.

**1.500 Acceptance**

**1.501 CRITERIA**

The State will define acceptance criteria according to individual Projects. Likewise, criteria for final acceptance will be defined within the individual Projects. Please refer to Article 2.250 Acceptance of Deliverables for the State’s acceptance process.



**1.600 Compensation and Payment**

**1.601 COMPENSATION AND PAYMENT**

**A. Method of Payment**

Contractor will provide a catalog of services and products and associated, not-to-exceed costs available under this Contract. Please see Attachment I Cost Table for the list of costs for products and services, included tiered volume discount bands.

Costs for Data, including Ortho-imagery Acquisition, LIDAR, and other products, shall be based on the number of square miles captured. All costs for associated services, including project management, photogrammetry, data-processing, and aerial flights, shall be bundled into the per-square-mile rate. Contractor will apply appropriate discounts to this rate for factors that reduce cost. Specific discounts are requested within Attachment I.

Costs for Data as a Service shall be based on the number of stored data Gigabytes per month. This rate shall include all associated services with DaaS, including setup and implementation of the service. Furthermore this rate shall include all data uploads, downloads, and transmissions.

Projects will be paid per acceptance of deliverable or milestone, as identified in individual Statements of Work, based on the Attachment I Costs Table attached must be used as the format for submitting pricing information.

**B. Administrative Fee**

1. The Contractor must remit an administrative fee on all sales transacted under this Contract, and remit the fee within 30 days after the end of each quarter. The administrative fee equals one (1) percent (1%) of the total quarterly sales reported.
2. The Contractor must pay the administrative fee by check payable to the State of Michigan. The Contractor must identify the check as an "Administrative Fee" and include the following information with the payment: the applicable Contract Number, the total quarterly sales by volume and dollar amount, and the quarter covered.
3. The Contractor must send the check to the following address:  
 Department of Technology, Management and Budget  
 Financial Services – Cashier Unit  
 Lewis Cass Building  
 320 South Walnut St.  
 P.O. Box 30681  
 Lansing, MI 48909

**C. Travel**

The State will not pay for any travel expenses, including hotel, mileage, meals, parking, etc. Travel time will not be reimbursed.



**D. Project Statements of Work and Issuance of Purchase Orders**

- Unless otherwise agreed by the parties, each Statement of Work will include:
  1. Project Objective
  2. Scope of Work
  3. Deliverables
  4. Acceptance Criteria
  5. Project Control and Reports
  6. Payment Schedule
  
  7. Project Contacts
  8. Agency Roles and Responsibilities
  9. Location of Where the Work is to be performed
  10. Expected Contractor Work Hours and Conditions
  
- The parties agree that the Services/Deliverables to be rendered by Contractor pursuant to this Contract (and any future amendments of it) will be defined and described in detail in Projects or Purchase Orders (PO) executed under this Contract. Contractor shall not be obliged or authorized to commence any work to implement a Project until authorized via a PO issued against this Contract. Contractor shall perform in accordance with this Contract, including the Projects/Purchase Orders executed under it.

**E. Invoicing**

Contractor will submit properly itemized invoices to

DTMB – Financial Services  
 Accounts Payable  
 P.O. Box 30026  
 Lansing, MI 48909  
 or  
[DTMB-Accounts-Payable@michigan.gov](mailto:DTMB-Accounts-Payable@michigan.gov)

- . Invoices must provide and itemize, as applicable:
  - Contract number;
  - Purchase Order number
  - Contractor name, address, phone number, and Federal Tax Identification Number;
  - Date(s) of delivery
  - Price for each item, or Contractor’s list price for each item and applicable discounts;
  - Net invoice price for each item;
  - Shipping costs;
  - Other applicable charges;
  - Total invoice price; and
  - Payment terms, including any available prompt payment discount.

The State may pay maintenance and support charges on a monthly basis, in arrears. Payment of maintenance service/support of less than one (1) month’s duration shall be prorated at 1/30th of the basic monthly maintenance charges for each calendar day.

Incorrect or incomplete invoices will be returned to Contractor for correction and reissue.



**1.602 HOLDBACK**

The State shall have the right to hold back an amount equal to ten percent (10%) of all amounts invoiced by Contractor for Services/Deliverables. The amounts held back shall be released to Contractor after the State has granted Final Acceptance.



**Article 2, Terms and Conditions**

**2.000 Contract Structure and Term**

**2.001 CONTRACT TERM**

This Contract is for a period of three (3) years beginning February 7, 2013 through February 6, 2016. All outstanding Purchase Orders must also expire upon the termination for any of the reasons listed in **Section 2.150** of the Contract, unless otherwise extended under the Contract. Absent an early termination for any reason, Purchase Orders issued but not expired, by the end of the Contract's stated term, shall remain in effect for the balance of the fiscal year for which they were issued.

**2.002 OPTIONS TO RENEW**

This Contract may be renewed in writing by mutual agreement of the parties not less than 30 days before its expiration. The Contract may be renewed for up to two (2) additional one-year periods.

**2.003 LEGAL EFFECT**

Contractor accepts this Contract by signing two copies of the Contract and returning them to the DTMB-Procurement. The Contractor shall not proceed with the performance of the work to be done under the Contract, including the purchase of necessary materials, until both parties have signed the Contract to show acceptance of its terms, and the Contractor receives a contract release/purchase order that authorizes and defines specific performance requirements.

Except as otherwise agreed in writing by the parties, the State shall not be liable for costs incurred by Contractor or payment under this Contract, until Contractor is notified in writing that this Contract or Change Order has been approved by the State Administrative Board (if required), signed by all the parties and a Purchase Order against the Contract has been issued.

**2.004 ATTACHMENTS & EXHIBITS**

All Attachments and Exhibits affixed to any and all Statement(s) of Work, or appended to or referencing this Contract, are incorporated in their entirety and form part of this Contract.

**2.005 ORDERING**

The State must issue an approved written Purchase Order, Blanket Purchase Order, Direct Voucher or Procurement Card Order to order any Services/Deliverables under this Contract. All orders are subject to the terms and conditions of this Contract. No additional terms and conditions contained on either a Purchase Order or Blanket Purchase Order apply unless they are specifically contained in that Purchase Order or Blanket Purchase Order's accompanying Statement of Work. Exact quantities to be purchased are unknown; however, the Contractor will be required to furnish all such materials and services as may be ordered during the Contract period. Quantities specified, if any, are estimates based on prior purchases, and the State is not obligated to purchase in these or any other quantities.

**2.006 ORDER OF PRECEDENCE**

The Contract, including any Statements of Work and Exhibits, to the extent not contrary to the Contract, each of which is incorporated for all purposes, constitutes the entire agreement between the parties with respect to the subject matter and supersedes all prior agreements, whether written or oral, with respect to the subject matter and as additional terms and conditions on the purchase order must apply as limited by **Section 2.005**.



In the event of any inconsistency between the terms of the Contract and a Statement of Work, the terms of the Statement of Work shall take precedence (as to that Statement of Work only); provided, however, that a Statement of Work may not modify or amend the terms of the Contract. The Contract may be modified or amended only by a formal Contract amendment.

**2.007 HEADINGS**

Captions and headings used in the Contract are for information and organization purposes. Captions and headings, including inaccurate references, do not, in any way, define or limit the requirements or terms and conditions of the Contract.

**2.008 FORM, FUNCTION & UTILITY**

If the Contract is for use of more than one State agency and if the Deliverable/Service does not meet the form, function, and utility required by that State agency, that agency may, subject to State purchasing policies, procure the Deliverable/Service from another source.

**2.009 REFORMATION AND SEVERABILITY**

Each provision of the Contract is severable from all other provisions of the Contract and, if one or more of the provisions of the Contract is declared invalid, the remaining provisions of the Contract remain in full force and effect.

**2.010 Consents and Approvals**

Except as expressly provided otherwise in the Contract, if either party requires the consent or approval of the other party for the taking of any action under the Contract, the consent or approval must be in writing and must not be unreasonably withheld or delayed.

**2.011 NO WAIVER OF DEFAULT**

If a party fails to insist upon strict adherence to any term of the Contract then the party has not waived the right to later insist upon strict adherence to that term, or any other term, of the Contract.

**2.012 SURVIVAL**

Any provisions of the Contract that impose continuing obligations on the parties, including without limitation the parties' respective warranty, indemnity and confidentiality obligations, survive the expiration or termination of the Contract for any reason. Specific references to survival in the Contract are solely for identification purposes and not meant to limit or prevent the survival of any other section

**2.020 Contract Administration**

**2.021 ISSUING OFFICE**

This Contract is issued by the Department of Technology, Management and Budget, Procurement (collectively, including all other relevant State of Michigan departments and agencies, the "State"). DTMB-Procurement is the sole point of contact in the State with regard to all procurement and contractual matters relating to the Contract. The DTMB-Procurement Contract Administrator for this Contract is:

Reid Sisson  
 Buyer  
 Procurement  
 Department of Technology, Management and Budget  
 Mason Bldg, 2nd Floor  
 PO Box 30026  
 Lansing, MI 48909  
[SissonR@michigan.gov](mailto:SissonR@michigan.gov)  
 517-24-1638



**2.022 CONTRACT COMPLIANCE INSPECTOR**

The Director of DTMB-Procurement directs the person named below, or his or her designee, to monitor and coordinate the activities for the Contract on a day-to-day basis during its term. **Monitoring Contract activities does not imply the authority to change, modify, clarify, amend, or otherwise alter the prices, terms, conditions and specifications of the Contract. DTMB-Procurement is the only State office authorized to change, modify, amend, alter or clarify the prices, specifications, terms and conditions of this Contract.** The Contract Compliance Inspector for this Contract is:

See Article 1.202.

**2.023 PROJECT MANAGER**

The following individual will oversee the project:

See Article 1.202.

**2.024 CHANGE REQUESTS**

The State reserves the right to request from time to time any changes to the requirements and specifications of the Contract and the work to be performed by the Contractor under the Contract. During the course of ordinary business, it may become necessary for the State to discontinue certain business practices or create Additional Services/Deliverables. At a minimum, to the extent applicable, Contractor shall provide a detailed outline of all work to be done, including tasks necessary to accomplish the Additional Services/Deliverables, timeframes, listing of key personnel assigned, estimated hours for each individual per task, and a complete and detailed cost justification.

If the State requests or directs the Contractor to perform any Services/Deliverables that are outside the scope of the Contractor’s responsibilities under the Contract (“New Work”), the Contractor must notify the State promptly before commencing performance of the requested activities it believes are New Work. If the Contractor fails to notify the State before commencing performance of the requested activities, any such activities performed before the Contractor gives notice shall be conclusively considered to be in-scope Services/Deliverables and not New Work.

If the State requests or directs the Contractor to perform any services or provide deliverables that are consistent with and similar to the Services/Deliverables being provided by the Contractor under the Contract, but which the Contractor reasonably and in good faith believes are not included within the Statements of Work, then before performing such Services or providing such Deliverables, the Contractor shall notify the State in writing that it considers the Services or Deliverables to be an Additional Service/Deliverable for which the Contractor should receive additional compensation. If the Contractor does not so notify the State, the Contractor shall have no right to claim thereafter that it is entitled to additional compensation for performing that Service or providing that Deliverable. If the Contractor does so notify the State, then such a Service or Deliverable shall be governed by the Change Request procedure in this Section.

In the event prices or service levels are not acceptable to the State, the Additional Services or New Work shall be subject to competitive bidding based upon the specifications.

- (1) Change Request at State Request  
If the State requires Contractor to perform New Work, Additional Services or make changes to the Services that would affect the Contract completion schedule or the amount of compensation due Contractor (a “Change”), the State shall submit a written request for Contractor to furnish a proposal for carrying out the requested Change (a “Change Request”).
- (2) Contractor Recommendation for Change Requests:  
Contractor shall be entitled to propose a Change to the State, on its own initiative, should Contractor believe the proposed Change would benefit the Contract.



- (3) Upon receipt of a Change Request or on its own initiative, Contractor shall examine the implications of the requested Change on the technical specifications, Contract schedule and price of the Deliverables and Services and shall submit to the State without undue delay a written proposal for carrying out the Change. Contractor’s proposal shall include any associated changes in the technical specifications, Contract schedule and price and method of pricing of the Services. If the Change is to be performed on a time and materials basis, the Amendment Labor Rates shall apply to the provision of such Services. If Contractor provides a written proposal and should Contractor be of the opinion that a requested Change is not to be recommended, it shall communicate its opinion to the State but shall nevertheless carry out the Change as specified in the written proposal if the State directs it to do so.
- (4) By giving Contractor written notice within a reasonable time, the State shall be entitled to accept a Contractor proposal for Change, to reject it, or to reach another agreement with Contractor. Should the parties agree on carrying out a Change, a written Contract Change Notice must be prepared and issued under this Contract, describing the Change and its effects on the Services and any affected components of this Contract (a “Contract Change Notice”).
- (5) No proposed Change shall be performed until the proposed Change has been specified in a duly executed Contract Change Notice issued by the Department of Technology, Management and Budget, Procurement.
- (6) If the State requests or directs the Contractor to perform any activities that Contractor believes constitute a Change, the Contractor must notify the State that it believes the requested activities are a Change before beginning to work on the requested activities. If the Contractor fails to notify the State before beginning to work on the requested activities, then the Contractor waives any right to assert any claim for additional compensation or time for performing the requested activities. If the Contractor commences performing work outside the scope of this Contract and then ceases performing that work, the Contractor must, at the request of the State, retract any out-of-scope work that would adversely affect the Contract.

**2.025 NOTICES**

Any notice given to a party under the Contract must be deemed effective, if addressed to the party as addressed below, upon: (i) delivery, if hand delivered; (ii) receipt of a confirmed transmission by facsimile if a copy of the notice is sent by another means specified in this Section; (iii) the third Business Day after being sent by U.S. mail, postage pre-paid, return receipt requested; or (iv) the next Business Day after being sent by a nationally recognized overnight express courier with a reliable tracking system.

State:

State of Michigan  
 Procurement  
 PO Box 30026  
 530 West Allegan  
 Lansing, Michigan 48909

Contractor: see Contract Notice cover page

Either party may change its address where notices are to be sent by giving notice according to this Section.

**2.026 BINDING COMMITMENTS**

Representatives of Contractor must have the authority to make binding commitments on Contractor’s behalf within the bounds set forth in the Contract. Contractor may change the representatives from time to time upon giving written notice.



**2.027 RELATIONSHIP OF THE PARTIES**

The relationship between the State and Contractor is that of client and independent contractor. No agent, employee, or servant of Contractor or any of its Subcontractors shall be deemed to be an employee, agent or servant of the State for any reason. Contractor shall be solely and entirely responsible for its acts and the acts of its agents, employees, servants and Subcontractors during the performance of the Contract.

**2.028 COVENANT OF GOOD FAITH**

Each party shall act reasonably and in good faith. Unless stated otherwise in the Contract, the parties shall not unreasonably delay, condition or withhold the giving of any consent, decision or approval that is either requested or reasonably required of them in order for the other party to perform its responsibilities under the Contract.

**2.029 ASSIGNMENTS**

Neither party may assign the Contract, or assign or delegate any of its duties or obligations under the Contract, to any other party (whether by operation of law or otherwise), without the prior written consent of the other party; provided, however, that the State may assign the Contract to any other State agency, department, division or department without the prior consent of Contractor and Contractor may assign the Contract to an affiliate so long as the affiliate is adequately capitalized and can provide adequate assurances that the affiliate can perform the Contract. The State may withhold consent from proposed assignments, subcontracts, or novations when the transfer of responsibility would operate to decrease the State's likelihood of receiving performance on the Contract or the State's ability to recover damages.

Contractor may not, without the prior written approval of the State, assign its right to receive payments due under the Contract. If the State permits an assignment, the Contractor is not relieved of its responsibility to perform any of its contractual duties and the requirement under the Contract that all payments must be made to one entity continues.

If the Contractor intends to assign the contract or any of the Contractor's rights or duties under the Contract, the Contractor must notify the State in writing at least 90 days before the assignment. The Contractor also must provide the State with adequate information about the assignee within a reasonable amount of time before the assignment for the State to determine whether to approve the assignment.

**2.030 General Provisions**

**2.031 MEDIA RELEASES**

News releases (including promotional literature and commercial advertisements) pertaining to the RFP and Contract or project to which it relates shall not be made without prior written State approval, and then only in accordance with the explicit written instructions from the State. No results of the activities associated with the RFP and Contract are to be released without prior written approval of the State and then only to persons designated.

**2.032 CONTRACT DISTRIBUTION**

DTMB-Procurement retains the sole right of Contract distribution to all State agencies and local units of government unless other arrangements are authorized by DTMB-Procurement.



**2.033 PERMITS**

Contractor must obtain and pay any associated costs for all required governmental permits, licenses and approvals for the delivery, installation and performance of the Services. The State shall pay for all costs and expenses incurred in obtaining and maintaining any necessary easements or right of way.

**2.034 WEBSITE INCORPORATION**

The State is not bound by any content on the Contractor’s website, even if the Contractor’s documentation specifically referenced that content and attempts to incorporate it into any other communication, unless the State has actual knowledge of the content and has expressly agreed to be bound by it in a writing that has been manually signed by an authorized representative of the State.

**2.035 FUTURE BIDDING PRECLUSION**

Contractor acknowledges that, to the extent this Contract involves the creation, research, investigation or generation of a future RFP; it may be precluded from bidding on the subsequent RFP. The State reserves the right to disqualify any Bidder if the State determines that the Bidder has used its position (whether as an incumbent Contractor, or as a Contractor hired to assist with the RFP development, or as a Vendor offering free assistance) to gain a competitive advantage on the RFP

**2.036 FREEDOM OF INFORMATION**

All information in any proposal submitted to the State by Contractor and this Contract is subject to the provisions of the Michigan Freedom of Information Act, 1976 Public Act No. 442, as amended, MCL 15.231, et seq (the “FOIA”).

**2.037 DISASTER RECOVERY**

Contractor and the State recognize that the State provides essential services in times of natural or man-made disasters. Therefore, except as so mandated by Federal disaster response requirements, Contractor personnel dedicated to providing Services/Deliverables under this Contract shall provide the State with priority service for repair and work around in the event of a natural or man-made disaster.

**2.040 Financial Provisions**

**2.041 FIXED PRICES FOR SERVICES/DELIVERABLES**

Each Statement of Work or Purchase Order issued under this Contract shall specify (or indicate by reference to the appropriate Contract Exhibit) the firm, fixed prices for all Services/Deliverables, and the associated payment milestones and payment amounts. The State may make progress payments to the Contractor when requested as work progresses, but not more frequently than monthly, in amounts approved by the Contract Administrator, after negotiation. Contractor shall show verification of measurable progress at the time of requesting progress payments.

**2.042 ADJUSTMENTS FOR REDUCTIONS IN SCOPE OF SERVICES/DELIVERABLES**

If the scope of the Services/Deliverables under any Statement of Work issued under this Contract is subsequently reduced by the State, the parties shall negotiate an equitable reduction in Contractor’s charges under such Statement of Work commensurate with the reduction in scope.

**2.043 SERVICES/DELIVERABLES COVERED**

The State shall not be obligated to pay any amounts in addition to the charges specified in this Contract for all Services/Deliverables to be provided by Contractor and its Subcontractors, if any, under this Contract,.



**2.044 INVOICING AND PAYMENT – IN GENERAL**

- (a) Each Statement of Work issued under this Contract shall list (or indicate by reference to the appropriate Contract Exhibit) the prices for all Services/Deliverables, equipment and commodities to be provided, and the associated payment milestones and payment amounts.
- (b) Each Contractor invoice shall show details as to charges by Service/Deliverable component and location at a level of detail reasonably necessary to satisfy the State’s accounting and charge-back requirements. Invoices for Services performed on a time and materials basis shall show, for each individual, the number of hours of Services performed during the billing period, the billable skill/labor category for such person and the applicable hourly billing rate. Prompt payment by the State is contingent on the Contractor’s invoices showing the amount owed by the State minus any holdback amount to be retained by the State in accordance with **Section 1.600**.
- (c) Correct invoices shall be due and payable by the State, in accordance with the State’s standard payment procedure as specified in 1984 Public Act No. 279, MCL 17.51 et seq., within 45 days after receipt, provided the State determines that the invoice was properly rendered.
- (d1) All invoices should reflect actual work done. Specific details of invoices and payments shall be agreed upon between the Contract Administrator and the Contractor after the proposed Contract Agreement has been signed and accepted by both the Contractor and the Director of Procurement, Department of Management & Budget. This activity shall occur only upon the specific written direction from DTMB-Procurement.

The specific payment schedule for any Contract(s) entered into, as the State and the Contractor(s) shall mutually agree upon. The schedule should show payment amount and should reflect actual work done by the payment dates, less any penalty cost charges accrued by those dates. As a general policy statements shall be forwarded to the designated representative by the 15th day of the following month.

The Government may make progress payments to the Contractor when requested as work progresses, but not more frequently than monthly, in amounts approved by the Contract Administrator, after negotiation. Contractor must show verification of measurable progress at the time of requesting progress payments.

**2.045 PRO-RATION**

To the extent there are Services that are to be paid for on a monthly basis, the cost of such Services shall be pro-rated for any partial month.

**2.046 ANTITRUST ASSIGNMENT**

The Contractor assigns to the State any claim for overcharges resulting from antitrust violations to the extent that those violations concern materials or services supplied by third parties to the Contractor, toward fulfillment of this Contract.

**2.047 FINAL PAYMENT**

The making of final payment by the State to Contractor does not constitute a waiver by either party of any rights or other claims as to the other party’s continuing obligations under the Contract, nor shall it constitute a waiver of any claims by one party against the other arising from unsettled claims or failure by a party to comply with this Contract, including claims for Services and Deliverables not reasonably known until after acceptance to be defective or substandard. Contractor’s acceptance of final payment by the State under this Contract shall constitute a waiver of all claims by Contractor against the State for payment under this Contract, other than those claims previously filed in writing on a timely basis and still unsettled.



**2.048 ELECTRONIC PAYMENT REQUIREMENT**

Electronic transfer of funds is required for payments on State Contracts. Contractors are required to register with the State electronically at <http://www.cpexpress.state.mi.us>. As stated in Public Act 431 of 1984, all contracts that the State enters into for the purchase of goods and services shall provide that payment shall be made by electronic fund transfer (EFT).

**2.050 Taxes**

**2.051 EMPLOYMENT TAXES**

Contractor shall collect and pay all applicable federal, state, and local employment taxes, including the taxes.

**2.052 SALES AND USE TAXES**

Contractor shall register and remit sales and use taxes on taxable sales of tangible personal property or services delivered into the State. Contractors that lack sufficient presence in Michigan to be required to register and pay tax must do so as a volunteer. This requirement extends to: (1) all members of any controlled group as defined in § 1563(a) of the Internal Revenue Code and applicable regulations of which the company is a member, and (2) all organizations under common control as defined in § 414(c) of the Internal Revenue Code and applicable regulations of which the company is a member that make sales at retail for delivery into the State are registered with the State for the collection and remittance of sales and use taxes. In applying treasury regulations defining “two or more trades or businesses under common control” the term “organization” means sole proprietorship, a partnership (as defined in § 701(a) (2) of the Internal Revenue Code), a trust, an estate, a corporation, or a limited liability company.

**2.060 Contract Management**

**2.061 CONTRACTOR PERSONNEL QUALIFICATIONS**

All persons assigned by Contractor to the performance of Services under this Contract must be employees of Contractor or its majority-owned (directly or indirectly, at any tier) subsidiaries (or a State-approved Subcontractor) and must be fully qualified to perform the work assigned to them. Contractor must include a similar provision in any subcontract entered into with a Subcontractor. For the purposes of this Contract, independent contractors engaged by Contractor solely in a staff augmentation role must be treated by the State as if they were employees of Contractor for this Contract only; however, the State understands that the relationship between Contractor and Subcontractor is an independent contractor relationship.

**2.062 CONTRACTOR KEY PERSONNEL**

- (a) The Contractor must provide the Contract Compliance Inspector with the names of the Key Personnel.
- (b) Key Personnel must be dedicated as defined in the Statement of Work to the Project for its duration in the applicable Statement of Work with respect to other individuals designated as Key Personnel for that Statement of Work.
- (c) The State shall have the right to recommend and approve in writing the initial assignment, as well as any proposed reassignment or replacement, of any Key Personnel. Before assigning an individual to any Key Personnel position, Contractor shall notify the State of the proposed assignment, shall introduce the individual to the appropriate State representatives, and shall provide the State with a resume and any other information about the individual reasonably requested by the State. The



- State reserves the right to interview the individual before granting written approval. In the event the State finds a proposed individual unacceptable, the State shall provide a written explanation including reasonable detail outlining the reasons for the rejection.
- (d) Contractor must not remove any Key Personnel from their assigned roles on the Contract without the prior written consent of the State. The Contractor's removal of Key Personnel without the prior written consent of the State is an unauthorized removal ("Unauthorized Removal"). Unauthorized Removals does not include replacing Key Personnel for reasons beyond the reasonable control of Contractor, including illness, disability, leave of absence, personal emergency circumstances, resignation or for cause termination of the Key Personnel's employment. Unauthorized Removals does not include replacing Key Personnel because of promotions or other job movements allowed by Contractor personnel policies or Collective Bargaining Agreement(s) as long as the State receives prior written notice before shadowing occurs and Contractor provides 30 days of shadowing unless parties agree to a different time period. The Contractor with the State must review any Key Personnel replacements, and appropriate transition planning will be established. Any Unauthorized Removal may be considered by the State to be a material breach of the Contract, in respect of which the State may elect to exercise its termination and cancellation rights.
  - (e) The Contractor must notify the Contract Compliance Inspector and the Contract Administrator at least 10 business days before redeploying non-Key Personnel, who are dedicated to primarily to the Project, to other projects. If the State does not object to the redeployment by its scheduled date, the Contractor may then redeploy the non-Key Personnel.

**2.063 RE-ASSIGNMENT OF PERSONNEL AT THE STATE'S REQUEST**

The State reserves the right to require the removal from the Project of Contractor personnel found, in the judgment of the State, to be unacceptable. The State's request must be written with reasonable detail outlining the reasons for the removal request. Additionally, the State's request must be based on legitimate, good faith reasons. Replacement personnel for the removed person must be fully qualified for the position. If the State exercises this right, and the Contractor cannot immediately replace the removed personnel, the State agrees to an equitable adjustment in schedule or other terms that may be affected by the State's required removal. If any incident with removed personnel results in delay not reasonably anticipatable under the circumstances and which is attributable to the State, the applicable SLAs for the affected Service shall not be counted for a time as agreed to by the parties.

**2.064 CONTRACTOR PERSONNEL LOCATION**

All staff assigned by Contractor to work on the Contract shall perform their duties either primarily at Contractor's offices and facilities or at State facilities. Without limiting the generality of the foregoing, Key Personnel shall, at a minimum, spend at least the amount of time on-site at State facilities as indicated in the applicable Statement of Work. Subject to availability, selected Contractor personnel may be assigned office space to be shared with State personnel.

**2.065 CONTRACTOR IDENTIFICATION**

Contractor employees must be clearly identifiable while on State property by wearing a State-issued badge, as required. Contractor employees are required to clearly identify themselves and the company they work for whenever making contact with State personnel by telephone or other means.

**2.066 COOPERATION WITH THIRD PARTIES**

Contractor agrees to cause its personnel and the personnel of any Subcontractors to cooperate with the State and its agents and other contractors including the State's Quality Assurance personnel. As reasonably requested by the State in writing, the Contractor shall provide to the State's agents and other contractors reasonable access to Contractor's Project personnel, systems and facilities to the extent the access relates to activities specifically associated with this Contract and shall not interfere or jeopardize the safety or operation of the systems or facilities. The State acknowledges that Contractor's time schedule for the Contract is very specific and agrees not to unnecessarily or unreasonably interfere with, delay or otherwise impeded Contractor's performance under this Contract with the requests for access.



**2.067 CONTRACT MANAGEMENT RESPONSIBILITIES**

Contractor shall be responsible for all acts and omissions of its employees, as well as the acts and omissions of any other personnel furnished by Contractor to perform the Services. Contractor shall have overall responsibility for managing and successfully performing and completing the Services/Deliverables, subject to the overall direction and supervision of the State and with the participation and support of the State as specified in this Contract. Contractor’s duties shall include monitoring and reporting the State’s performance of its participation and support responsibilities (as well as Contractor’s own responsibilities) and providing timely notice to the State in Contractor’s reasonable opinion if the State’s failure to perform its responsibilities in accordance with the Project Plan is likely to delay the timely achievement of any Contract tasks.

The Contractor shall provide the Services/Deliverables directly or through its affiliates, subsidiaries, subcontractors or resellers. Regardless of the entity providing the Service/Deliverable, the Contractor shall act as a single point of contact coordinating these entities to meet the State’s need for Services/Deliverables. Nothing in this Contract, however, shall be construed to authorize or require any party to violate any applicable law or regulation in its performance of this Contract.

**2.068 CONTRACTOR RETURN OF STATE EQUIPMENT/RESOURCES**

The Contractor shall return to the State any State-furnished equipment, facilities and other resources when no longer required for the Contract in the same condition as when provided by the State, reasonable wear and tear excepted.

**2.070 Subcontracting by Contractor**

**2.071 CONTRACTOR FULL RESPONSIBILITY**

Contractor shall have full responsibility for the successful performance and completion of all of the Services and Deliverables. The State shall consider Contractor to be the sole point of contact with regard to all contractual matters under this Contract, including payment of any and all charges for Services and Deliverables.

**2.072 STATE CONSENT TO DELEGATION**

Contractor shall not delegate any duties under this Contract to a Subcontractor unless the Department of Technology, Management and Budget, Procurement has given written consent to such delegation. The State shall have the right of prior written approval of all Subcontractors and to require Contractor to replace any Subcontractors found, in the reasonable judgment of the State, to be unacceptable. The State’s request shall be written with reasonable detail outlining the reasons for the removal request. Additionally, the State’s request shall be based on legitimate, good faith reasons. Replacement Subcontractor(s) for the removed Subcontractor shall be fully qualified for the position. If the State exercises this right, and the Contractor cannot immediately replace the removed Subcontractor, the State shall agree to an equitable adjustment in schedule or other terms that may be affected by the State’s required removal. If any such incident with a removed Subcontractor results in delay not reasonable anticipatable under the circumstances and which is attributable to the State, the applicable SLA for the affected Work shall not be counted for a time agreed upon by the parties.

**2.073 SUBCONTRACTOR BOUND TO CONTRACT**

In any subcontracts entered into by Contractor for the performance of the Services, Contractor shall require the Subcontractor, to the extent of the Services to be performed by the Subcontractor, to be bound to Contractor by the terms of this Contract and to assume toward Contractor all of the obligations and responsibilities that Contractor, by this Contract, assumes toward the State. The State reserves the right to receive copies of and review all subcontracts, although Contractor may delete or mask any proprietary information, including pricing, contained in such contracts before providing them to the State.



The management of any Subcontractor shall be the responsibility of Contractor, and Contractor shall remain responsible for the performance of its Subcontractors to the same extent as if Contractor had not subcontracted such performance. Contractor shall make all payments to Subcontractors or suppliers of Contractor. Except as otherwise agreed in writing by the State and Contractor, the State shall not be obligated to direct payments for the Services other than to Contractor. The State's written approval of any Subcontractor engaged by Contractor to perform any obligation under this Contract shall not relieve Contractor of any obligations or performance required under this Contract. A list of the Subcontractors, if any, approved by the State as of the execution of this Contract, together with a copy of the applicable subcontract is attached.

**2.074 FLOW DOWN**

Except where specifically approved in writing by the State on a case-by-case basis, Contractor shall flow down the obligations in **Sections 2.031, 2.060, 2.100, 2.110, 2.120, 2.130, and 2.200** in all of its agreements with any Subcontractors.

**2.075 COMPETITIVE SELECTION**

The Contractor shall select subcontractors (including suppliers) on a competitive basis to the maximum practical extent consistent with the objectives and requirements of the Contract.

**2.080 State Responsibilities**

**2.081 EQUIPMENT**

The State shall provide only the equipment and resources identified in the Statement of Work and other Contract Exhibits.

**2.082 FACILITIES**

The State must designate space as long as it is available and as provided in the Statement of Work, to house the Contractor's personnel whom the parties agree will perform the Services/Deliverables at State facilities (collectively, the "State Facilities"). The Contractor shall have reasonable access to, and unless agreed otherwise by the parties in writing must observe and comply with all rules and regulations relating to each of the State Facilities (including hours of operation) used by the Contractor in the course of providing the Services. Contractor agrees that it shall not, without the prior written consent of the State, use any State Facilities or access any State information systems provided for the Contractor's use, or to which the Contractor otherwise gains access in the course of performing the Services, for any purpose other than providing the Services to the State.

**2.090 Security**

**2.091 BACKGROUND CHECKS**

On a case-by-case basis, the State may investigate the Contractor's personnel before they may have access to State facilities and systems. The scope of the background check is at the discretion of the State and the results shall be used to determine Contractor personnel eligibility for working within State facilities and systems. The investigations shall include Michigan State Police Background checks (ICHAT) and may include the National Crime Information Center (NCIC) Finger Prints. Proposed Contractor personnel may be required to complete and submit an RI-8 Fingerprint Card for the NCIC Finger Print Check. Any request for background checks shall be initiated by the State and shall be reasonably related to the type of work requested.



All Contractor personnel shall also be expected to comply with the State’s security and acceptable use policies for State IT equipment and resources. See <http://www.michigan.gov/dtmb>. Furthermore, Contractor personnel shall be expected to agree to the State’s security and acceptable use policies before the Contractor personnel shall be accepted as a resource to perform work for the State. It is expected the Contractor shall present these documents to the prospective employee before the Contractor presents the individual to the State as a proposed resource. Contractor staff shall be expected to comply with all Physical Security procedures in place within the facilities where they are working.

**2.092 SECURITY BREACH NOTIFICATION**

If the Contractor breaches this Section, the Contractor must (i) promptly cure any deficiencies and (ii) comply with any applicable federal and state laws and regulations pertaining to unauthorized disclosures. Contractor and the State shall cooperate to mitigate, to the extent practicable, the effects of any breach, intrusion, or unauthorized use or disclosure. Contractor must report to the State in writing any use or disclosure of Confidential Information, whether suspected or actual, other than as provided for by the Contract within 10 days of becoming aware of the use or disclosure or the shorter time period as is reasonable under the circumstances.

**2.093 PCI DATA SECURITY STANDARD**

(a) Contractors that process, transmit or store credit/debit cardholder data, must adhere to the Payment Card Industry (PCI) Data Security Standards. The Contractor is responsible for the security of cardholder data in its possession. The data may only be used to assist the State or for other uses specifically authorized by law.

(b) The Contractor must notify the CCI (within 72 hours of discovery) of any breaches in security where cardholder data has been compromised. In that event, the Contractor must provide full cooperation to the Visa, MasterCard, Discover and state Acquirer representative(s), and/or a PCI approved third party to conduct a thorough security review. The Contractor must make the forensic report available within two weeks of completion. The review must validate compliance with the current PCI Data Security Standards for protecting cardholder data.

(c) The Contractor must properly dispose of cardholder data, in compliance with DTMB policy, when it is no longer needed. The Contractor must continue to treat cardholder data as confidential upon contract termination.

(d) The Contractor must provide the CCI with an annual Attestation of Compliance (AOC) or a Report on Compliance (ROC) showing the contractor is in compliance with the PCI Data Security Standards. The Contractor must notify the CCI of all failures to comply with the PCI Data Security Standard.

**2.100 Confidentiality**

**2.101 CONFIDENTIALITY**

Contractor and the State each acknowledge that the other possesses and shall continue to possess confidential information that has been developed or received by it. As used in this Section, “Confidential Information” of Contractor must mean all non-public proprietary information of Contractor (other than Confidential Information of the State as defined below), which is marked confidential, restricted, proprietary, or with a similar designation. “Confidential Information” of the State must mean any information which is retained in confidence by the State (or otherwise required to be held in confidence by the State under applicable federal, state and local laws and regulations) or which, in the case of tangible materials provided to Contractor by the State under its performance under this Contract, is marked as confidential, proprietary or with a similar designation by the State. “Confidential Information” excludes any information (including this Contract) that is publicly available under the Michigan FOIA.



**2.102 PROTECTION AND DESTRUCTION OF CONFIDENTIAL INFORMATION**

The State and Contractor shall each use at least the same degree of care to prevent disclosing to third parties the Confidential Information of the other as it employs to avoid unauthorized disclosure, publication or dissemination of its own confidential information of like character, but in no event less than reasonable care. Neither Contractor nor the State shall (i) make any use of the Confidential Information of the other except as contemplated by this Contract, (ii) acquire any right in or assert any lien against the Confidential Information of the other, or (iii) if requested to do so, refuse for any reason to promptly return the other party's Confidential Information to the other party. Each party shall limit disclosure of the other party's Confidential Information to employees and Subcontractors who must have access to fulfill the purposes of this Contract. Disclosure to, and use by, a Subcontractor is permissible where (A) use of a Subcontractor is authorized under this Contract, (B) the disclosure is necessary or otherwise naturally occurs in connection with work that is within the Subcontractor's scope of responsibility, and (C) Contractor obligates the Subcontractor in a written Contract to maintain the State's Confidential Information in confidence. At the State's request, any employee of Contractor and of any Subcontractor having access or continued access to the State's Confidential Information may be required to execute an acknowledgment that the employee has been advised of Contractor's and the Subcontractor's obligations under this Section and of the employee's obligation to Contractor or Subcontractor, as the case may be, to protect the Confidential Information from unauthorized use or disclosure.

Promptly upon termination or cancellation of the Contract for any reason, Contractor must certify to the State that Contractor has destroyed all State Confidential Information.

**2.103 EXCLUSIONS**

Notwithstanding the foregoing, the provisions in this Section shall not apply to any particular information which the State or Contractor can demonstrate (i) was, at the time of disclosure to it, in the public domain; (ii) after disclosure to it, is published or otherwise becomes part of the public domain through no fault of the receiving party; (iii) was in the possession of the receiving party at the time of disclosure to it without an obligation of confidentiality; (iv) was received after disclosure to it from a third party who had a lawful right to disclose the information to it without any obligation to restrict its further disclosure; or (v) was independently developed by the receiving party without reference to Confidential Information of the furnishing party. Further, the provisions of this Section shall not apply to any particular Confidential Information to the extent the receiving party is required by law to disclose the Confidential Information, provided that the receiving party (i) promptly provides the furnishing party with notice of the legal request, and (ii) assists the furnishing party in resisting or limiting the scope of the disclosure as reasonably requested by the furnishing party.

**2.104 NO IMPLIED RIGHTS**

Nothing contained in this Section must be construed as obligating a party to disclose any particular Confidential Information to the other party, or as granting to or conferring on a party, expressly or impliedly, any right or license to the Confidential Information of the other party.

**2.105 RESPECTIVE OBLIGATIONS**

The parties' respective obligations under this Section must survive the termination or expiration of this Contract for any reason.

**2.110 Records and Inspections**

**2.111 INSPECTION OF WORK PERFORMED**

The State's authorized representatives shall at all reasonable times and with 10 days prior written request, have the right to enter Contractor's premises, or any other places, where the Services are being performed, and shall have access, upon reasonable request, to interim drafts of Deliverables or work-in-progress. Upon 10 Days prior written notice and at all reasonable times, the State's representatives shall



be allowed to inspect, monitor, or otherwise evaluate the work being performed and to the extent that the access will not reasonably interfere or jeopardize the safety or operation of the systems or facilities. Contractor shall provide all reasonable facilities and assistance for the State's representatives.

**2.112 EXAMINATION OF RECORDS**

For seven years after the Contractor provides any work under this Contract (the "Audit Period"), the State may examine and copy any of Contractor's books, records, documents and papers pertinent to establishing Contractor's compliance with the Contract and with applicable laws and rules. The State shall notify the Contractor 20 days before examining the Contractor's books and records. The State does not have the right to review any information deemed confidential by the Contractor to the extent access would require the confidential information to become publicly available. This provision also applies to the books, records, accounts, documents and papers, in print or electronic form, of any parent, affiliated or subsidiary organization of Contractor, or any Subcontractor of Contractor performing services in connection with the Contract.

**2.113 RETENTION OF RECORDS**

Contractor shall maintain at least until the end of the Audit Period all pertinent financial and accounting records (including time sheets and payroll records, and information pertaining to the Contract and to the Services, equipment, and commodities provided under the Contract) pertaining to the Contract according to generally accepted accounting principles and other procedures specified in this Section. Financial and accounting records shall be made available, upon request, to the State at any time during the Audit Period. If an audit, litigation, or other action involving Contractor's records is initiated before the end of the Audit Period, the records shall be retained until all issues arising out of the audit, litigation, or other action are resolved or until the end of the Audit Period, whichever is later.

**2.114 AUDIT RESOLUTION**

If necessary, the Contractor and the State shall meet to review each audit report promptly after issuance. The Contractor shall respond to each audit report in writing within 30 days from receipt of the report, unless a shorter response time is specified in the report. The Contractor and the State shall develop, agree upon and monitor an action plan to promptly address and resolve any deficiencies, concerns, and/or recommendations in the audit report.

**2.115 ERRORS**

If the audit demonstrates any errors in the documents provided to the State, then the amount in error shall be reflected as a credit or debit on the next invoice and in subsequent invoices until the amount is paid or refunded in full. However, a credit or debit may not be carried for more than four invoices. If a balance remains after four invoices, then the remaining amount shall be due as a payment or refund within 45 days of the last quarterly invoice that the balance appeared on or termination of the contract, whichever is earlier.

In addition to other available remedies, the difference between the payment received and the correct payment amount is greater than 10%, then the Contractor shall pay all of the reasonable costs of the audit.

**2.120 Warranties**

**2.121 WARRANTIES AND REPRESENTATIONS**

The Contractor represents and warrants:

- (a) It is capable in all respects of fulfilling and must fulfill all of its obligations under this Contract. The performance of all obligations under this Contract must be provided in a timely, professional, and



- workman-like manner and must meet the performance and operational standards required under this Contract.
- (b) The Contract Appendices, Attachments and Exhibits identify the equipment and software and services necessary for the Deliverable(s) to perform and Services to operate in compliance with the Contract's requirements and other standards of performance.
  - (c) It is the lawful owner or licensee of any Deliverable licensed or sold to the State by Contractor or developed by Contractor under this Contract, and Contractor has all of the rights necessary to convey to the State the ownership rights or licensed use, as applicable, of any and all Deliverables. None of the Deliverables provided by Contractor to the State under neither this Contract, nor their use by the State shall infringe the patent, copyright, trade secret, or other proprietary rights of any third party.
  - (d) If, under this Contract, Contractor procures any equipment, software or other Deliverable for the State (including equipment, software and other Deliverables manufactured, re-marketed or otherwise sold by Contractor under Contractor's name), then in addition to Contractor's other responsibilities with respect to the items in this Contract, Contractor must assign or otherwise transfer to the State or its designees, or afford the State the benefits of, any manufacturer's warranty for the Deliverable.
  - (e) The contract signatory has the power and authority, including any necessary corporate authorizations, necessary to enter into this Contract, on behalf of Contractor.
  - (f) It is qualified and registered to transact business in all locations where required.
  - (g) Neither the Contractor nor any Affiliates, nor any employee of either, has, must have, or must acquire, any contractual, financial, business, or other interest, direct or indirect, that would conflict in any manner or degree with Contractor's performance of its duties and responsibilities to the State under this Contract or otherwise create an appearance of impropriety with respect to the award or performance of this Agreement. Contractor must notify the State about the nature of the conflict or appearance of impropriety within two days of learning about it.
  - (h) Neither Contractor nor any Affiliates, nor any employee of either has accepted or must accept anything of value based on an understanding that the actions of the Contractor or Affiliates or employee on behalf of the State would be influenced. Contractor must not attempt to influence any State employee by the direct or indirect offer of anything of value.
  - (i) Neither Contractor nor any Affiliates, nor any employee of either has paid or agreed to pay any person, other than bona fide employees and consultants working solely for Contractor or the Affiliate, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or making of this Contract.
  - (j) The prices proposed by Contractor were arrived at independently, without consultation, communication, or agreement with any other Bidder for the purpose of restricting competition; the prices quoted were not knowingly disclosed by Contractor to any other Bidder; and no attempt was made by Contractor to induce any other person to submit or not submit a proposal for the purpose of restricting competition.
  - (k) All financial statements, reports, and other information furnished by Contractor to the State as part of its response to the RFP or otherwise in connection with the award of this Contract fairly and accurately represent the business, properties, financial condition, and results of operations of Contractor as of the respective dates, or for the respective periods, covered by the financial statements, reports, other information. Since the respective dates or periods covered by the financial statements, reports, or other information, there have been no material adverse changes in the business, properties, financial condition, or results of operations of Contractor.
  - (l) All written information furnished to the State by or for the Contractor in connection with this Contract, including its bid, is true, accurate, and complete, and contains no untrue statement of material fact or omits any material fact necessary to make the information not misleading.
  - (m) It is not in material default or breach of any other contract or agreement that it may have with the State or any of its departments, commissions, boards, or agencies. Contractor further represents and warrants that it has not been a party to any contract with the State or any of its departments that was terminated by the State or the department within the previous five years for the reason that Contractor failed to perform or otherwise breached an obligation of the contract.



- (n) If any of the certifications, representations, or disclosures made in the Contractor’s original bid response change after contract award, the Contractor is required to report those changes immediately to the Department of Technology, Management and Budget, Procurement.

**2.122 WARRANTY OF MERCHANTABILITY**

Goods provided by Contractor under this agreement shall be merchantable. All goods provided under this Contract shall be of good quality within the description given by the State, shall be fit for their ordinary purpose, shall be adequately contained and packaged within the description given by the State, shall conform to the agreed upon specifications, and shall conform to the affirmations of fact made by the Contractor or on the container or label.

**2.123 WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE**

When the Contractor has reason to know or knows any particular purpose for which the goods are required, and the State is relying on the Contractor’s skill or judgment to select or furnish suitable goods, there is a warranty that the goods are fit for such purpose.

**2.124 WARRANTY OF TITLE**

Contractor shall, in providing goods to the State, convey good title in those goods, whose transfer is right and lawful. All goods provided by Contractor shall be delivered free from any security interest, lien, or encumbrance of which the State, at the time of contracting, has no knowledge. Goods provided by Contractor, under this Contract, shall be delivered free of any rightful claim of any third person by of infringement or the like.

**2.125 EQUIPMENT WARRANTY**

To the extent Contractor is responsible under this Contract for maintaining equipment/system(s), Contractor represents and warrants that it shall maintain the equipment/system(s) in good operating condition and shall undertake all repairs and preventive maintenance according to the applicable manufacturer's recommendations for the period specified in this Contract.

The Contractor represents and warrants that the equipment/system(s) are in good operating condition and operates and performs to the requirements and other standards of performance contained in this Contract, when installed, at the time of Final Acceptance by the State, and for a period of (1) one year commencing upon the first day following Final Acceptance.

Within twenty business days of notification from the State, the Contractor must adjust, repair or replace all equipment that is defective or not performing in compliance with the Contract. The Contractor must assume all costs for replacing parts or units and their installation including transportation and delivery fees, if any.

The Contractor must provide a toll-free telephone number to allow the State to report equipment failures and problems to be remedied by the Contractor.

The Contractor agrees that all warranty service it provides under this Contract must be performed by Original Equipment Manufacturer (OEM) trained, certified and authorized technicians.

The Contractor is the sole point of contact for warranty service. The Contractor warrants that it shall pass through to the State any warranties obtained or available from the original equipment manufacturer, including any replacement, upgraded, or additional equipment warranties.

**2.126 EQUIPMENT TO BE NEW**

If applicable, all equipment provided under this Contract by Contractor shall be new where Contractor has knowledge regarding whether the equipment is new or assembled from new or serviceable used parts that are like new in performance or has the option of selecting one or the other. Equipment that is assembled from new or serviceable used parts that are like new in performance is acceptable where



Contractor does not have knowledge or the ability to select one or other, unless specifically agreed otherwise in writing by the State.

**2.127 PROHIBITED PRODUCTS**

The State will not accept salvage, distressed, outdated or discontinued merchandise. Shipping of such merchandise to any State agency, as a result of an order placed against the Contract, shall be considered default by the Contractor of the terms and conditions of the Contract and may result in cancellation of the Contract by the State. The brand and product number offered for all items shall remain consistent for the term of the Contract, unless DTMB-Procurement has approved a change order pursuant to **Section 2.024**.

**2.128 CONSEQUENCES FOR BREACH**

In addition to any remedies available in law, if the Contractor breaches any of the warranties contained in this section, the breach may be considered as a default in the performance of a material obligation of this Contract.

**2.130 Insurance**

**2.131 LIABILITY INSURANCE**

The Contractor must provide proof of the minimum levels of insurance coverage as indicated below. The insurance must protect the State from claims that may arise out of or result from the Contractor's performance of services under the terms of this Contract, whether the services are performed by the Contractor, or by any subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.

The Contractor waives all rights against the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees and agents for recovery of damages to the extent these damages are covered by the insurance policies the Contractor is required to maintain under this Contract.

All insurance coverage provided relative to this Contract/Purchase Order is PRIMARY and NON-CONTRIBUTING to any comparable liability insurance (including self-insurances) carried by the State.

The insurance must be written for not less than any minimum coverage specified in this Contract or required by law, whichever is greater.

The insurers selected by Contractor must have an A.M. Best rating of A or better, or as otherwise approved in writing by the State, or if the ratings are no longer available, with a comparable rating from a recognized insurance rating agency. All policies of insurance required in this Contract must be issued by companies that have been approved to do business in the State.

See [www.michigan.gov/dleg](http://www.michigan.gov/dleg).

Where specific limits are shown, they are the minimum acceptable limits. If Contractor's policy contains higher limits, the State must be entitled to coverage to the extent of the higher limits.

The Contractor is required to pay for and provide the type and amount of insurance checked  below:

- 1. Commercial General Liability with the following minimum coverage:
  - \$2,000,000 General Aggregate Limit other than Products/Completed Operations
  - \$2,000,000 Products/Completed Operations Aggregate Limit
  - \$1,000,000 Personal & Advertising Injury Limit
  - \$1,000,000 Each Occurrence Limit



The Contractor must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees and agents as ADDITIONAL INSUREDS on the Commercial General Liability certificate. The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company.

- 2. If a motor vehicle is used to provide services or products under this Contract, the Contractor must have vehicle liability insurance on any auto including owned, hired and non-owned vehicles used in Contractor's business for bodily injury and property damage as required by law.

The Contractor must list the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees and agents as ADDITIONAL INSUREDS on the vehicle liability certificate. The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company.

- 3. Workers' compensation coverage must be provided according to applicable laws governing the employees and employers work activities in the state of the Contractor's domicile. If a self-insurer provides the applicable coverage, proof must be provided of approved self-insured authority by the jurisdiction of domicile. For employees working outside of the state of qualification, Contractor must provide appropriate certificates of insurance proving mandated coverage levels for the jurisdictions where the employees' activities occur.

Any certificates of insurance received must also provide a list of states where the coverage is applicable.

The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company. This provision must not be applicable where prohibited or limited by the laws of the jurisdiction in which the work is to be performed.

- 4. Employers liability insurance with the following minimum limits:
  - \$100,000 each accident
  - \$100,000 each employee by disease
  - \$500,000 aggregate disease

- 5. Employee Fidelity, including Computer Crimes, insurance naming the State as a loss payee, providing coverage for direct loss to the State and any legal liability of the State arising out of or related to fraudulent or dishonest acts committed by the employees of Contractor or its Subcontractors, acting alone or in collusion with others, in a minimum amount of one million dollars (\$1,000,000.00) with a maximum deductible of fifty thousand dollars (\$50,000.00).

- 6. Umbrella or Excess Liability Insurance in a minimum amount of ten million dollars (\$10,000,000.00), which must apply, at a minimum, to the insurance required in Subsection 1 (Commercial General Liability) above.

- 7. Professional Liability (Errors and Omissions) Insurance with the following minimum coverage: three million dollars (\$3,000,000.00) each occurrence and three million dollars (\$3,000,000.00) annual aggregate.

- 8. Fire and Personal Property Insurance covering against any loss or damage to the office space used by Contractor for any reason under this Contract, and the equipment, software and other contents of the office space, including without limitation, those contents used by Contractor to provide the Services to the State, up to its replacement value, where the office space and its contents are under the care, custody and control of Contractor. The policy must cover all risks of direct physical loss or damage, including without limitation, flood and earthquake coverage and coverage for computer hardware and software. The State must be endorsed on the policy as a loss payee as its interests appear.



**2.132 SUBCONTRACTOR INSURANCE COVERAGE**

Except where the State has approved in writing a Contractor subcontract with other insurance provisions, Contractor must require all of its Subcontractors under this Contract to purchase and maintain the insurance coverage as described in this Section for the Contractor in connection with the performance of work by those Subcontractors. Alternatively, Contractor may include any Subcontractors under Contractor’s insurance on the coverage required in this Section. Subcontractor(s) must fully comply with the insurance coverage required in this Section. Failure of Subcontractor(s) to comply with insurance requirements does not limit Contractor’s liability or responsibility.

**2.133 CERTIFICATES OF INSURANCE AND OTHER REQUIREMENTS**

Contractor must furnish to DTMB-Procurement, certificate(s) of insurance verifying insurance coverage or providing satisfactory evidence of self-insurance as required in this Section (the “Certificates”). The Certificate must be on the standard “accord” form or equivalent. **The Contract Number or the Purchase Order Number must be shown on the Certificate Of Insurance To Assure Correct Filing.** All Certificate(s) are to be prepared and submitted by the Insurance Provider. All Certificate(s) must contain a provision indicating that coverage afforded under the policies SHALL NOT BE CANCELLED, MATERIALLY CHANGED, OR NOT RENEWED without 30 days prior written notice, except for 10 days for non-payment of premium, having been given to the Director of Procurement, Department of Technology, Management and Budget. The notice must include the Contract or Purchase Order number affected. Before the Contract is signed, and not less than 20 days before the insurance expiration date every year thereafter, the Contractor must provide evidence that the State and its agents, officers and employees are listed as additional insured under each commercial general liability and commercial automobile liability policy. In the event the State approves the representation of the State by the insurer’s attorney, the attorney may be required to be designated as a Special Assistant Attorney General by the Attorney General of the State of Michigan.

The Contractor must maintain all required insurance coverage throughout the term of the Contract and any extensions and, in the case of claims-made Commercial General Liability policies, must secure tail coverage for at least three years following the expiration or termination for any reason of this Contract. The minimum limits of coverage specified above are not intended, and must not be construed; to limit any liability or indemnity of Contractor under this Contract to any indemnified party or other persons. Contractor is responsible for all deductibles with regard to the insurance. If the Contractor fails to pay any premium for required insurance as specified in this Contract, or if any insurer cancels or significantly reduces any required insurance as specified in this Contract without the State’s written consent, then the State may, after the State has given the Contractor at least 30 days written notice, pay the premium or procure similar insurance coverage from another company or companies. The State may deduct any part of the cost from any payment due the Contractor, or the Contractor must pay that cost upon demand by the State.

**2.140 Indemnification**

**2.141 GENERAL INDEMNIFICATION**

To the extent permitted by law, the Contractor must indemnify, defend and hold harmless the State from liability, including all claims and losses, and all related costs and expenses (including reasonable attorneys’ fees and costs of investigation, litigation, settlement, judgments, interest and penalties), accruing or resulting to any person, firm or corporation that may be injured or damaged by the Contractor in the performance of this Contract and that are attributable to the negligence or tortious acts of the Contractor or any of its subcontractors, or by anyone else for whose acts any of them may be liable.

**2.142 CODE INDEMNIFICATION**

To the extent permitted by law, the Contractor shall indemnify, defend and hold harmless the State from any claim, loss, or expense arising from Contractor’s breach of the No Surreptitious Code Warranty.



**2.143 EMPLOYEE INDEMNIFICATION**

In any claims against the State of Michigan, its departments, divisions, agencies, sections, commissions, officers, employees and agents, by any employee of the Contractor or any of its subcontractors, the indemnification obligation under the Contract must not be limited in any way by the amount or type of damages, compensation or benefits payable by or for the Contractor or any of its subcontractors under worker’s disability compensation acts, disability benefit acts or other employee benefit acts. This indemnification clause is intended to be comprehensive. Any overlap in provisions, or the fact that greater specificity is provided as to some categories of risk, is not intended to limit the scope of indemnification under any other provisions.

**2.144 PATENT/COPYRIGHT INFRINGEMENT INDEMNIFICATION**

To the extent permitted by law, the Contractor must indemnify, defend and hold harmless the State from and against all losses, liabilities, damages (including taxes), and all related costs and expenses (including reasonable attorneys’ fees and costs of investigation, litigation, settlement, judgments, interest and penalties) incurred in connection with any action or proceeding threatened or brought against the State to the extent that the action or proceeding is based on a claim that any piece of equipment, software, commodity or service supplied by the Contractor or its subcontractors, or the operation of the equipment, software, commodity or service, or the use or reproduction of any documentation provided with the equipment, software, commodity or service infringes any United States patent, copyright, trademark or trade secret of any person or entity, which is enforceable under the laws of the United States.

In addition, should the equipment, software, commodity, or service, or its operation, become or in the State’s or Contractor’s opinion be likely to become the subject of a claim of infringement, the Contractor must at the Contractor’s sole expense (i) procure for the State the right to continue using the equipment, software, commodity or service or, if the option is not reasonably available to the Contractor, (ii) replace or modify to the State’s satisfaction the same with equipment, software, commodity or service of equivalent function and performance so that it becomes non-infringing, or, if the option is not reasonably available to Contractor, (iii) accept its return by the State with appropriate credits to the State against the Contractor’s charges and reimburse the State for any losses or costs incurred as a consequence of the State ceasing its use and returning it.

Notwithstanding the foregoing, the Contractor has no obligation to indemnify or defend the State for, or to pay any costs, damages or attorneys’ fees related to, any claim based upon (i) equipment developed based on written specifications of the State; (ii) use of the equipment in a configuration other than implemented or approved in writing by the Contractor, including, but not limited to, any modification of the equipment by the State; or (iii) the combination, operation, or use of the equipment with equipment or software not supplied by the Contractor under this Contract.

**2.145 CONTINUATION OF INDEMNIFICATION OBLIGATIONS**

The Contractor’s duty to indemnify under this Section continues in full force and effect, notwithstanding the expiration or early cancellation of the Contract, with respect to any claims based on facts or conditions that occurred before expiration or cancellation.

**2.146 INDEMNIFICATION PROCEDURES**

The procedures set forth below must apply to all indemnity obligations under this Contract.

- (a) After the State receives notice of the action or proceeding involving a claim for which it shall seek indemnification, the State must promptly notify Contractor of the claim in writing and take or assist Contractor in taking, as the case may be, any reasonable action to avoid the imposition of a default judgment against Contractor. No failure to notify the Contractor relieves the Contractor of its indemnification obligations except to the extent that the Contractor can prove damages attributable to the failure. Within 10 days following receipt of written notice from the State relating to any claim, the Contractor must notify the State in writing whether Contractor agrees to assume control of the defense and settlement of that claim (a “Notice of Election”). After notifying Contractor of a claim and before the State receiving Contractor’s Notice of Election, the State is entitled to defend against



- the claim, at the Contractor’s expense, and the Contractor will be responsible for any reasonable costs incurred by the State in defending against the claim during that period.
- (b) If Contractor delivers a Notice of Election relating to any claim: (i) the State is entitled to participate in the defense of the claim and to employ counsel at its own expense to assist in the handling of the claim and to monitor and advise the State about the status and progress of the defense; (ii) the Contractor must, at the request of the State, demonstrate to the reasonable satisfaction of the State, the Contractor’s financial ability to carry out its defense and indemnity obligations under this Contract; (iii) the Contractor must periodically advise the State about the status and progress of the defense and must obtain the prior written approval of the State before entering into any settlement of the claim or ceasing to defend against the claim and (iv) to the extent that any principles of Michigan governmental or public law may be involved or challenged, the State has the right, at its own expense, to control the defense of that portion of the claim involving the principles of Michigan governmental or public law. But the State may retain control of the defense and settlement of a claim by notifying the Contractor in writing within 10 days after the State’s receipt of Contractor’s information requested by the State under clause (ii) of this paragraph if the State determines that the Contractor has failed to demonstrate to the reasonable satisfaction of the State the Contractor’s financial ability to carry out its defense and indemnity obligations under this Section. Any litigation activity on behalf of the State, or any of its subdivisions under this Section, must be coordinated with the Department of Attorney General. In the event the insurer’s attorney represents the State under this Section, the insurer’s attorney may be required to be designated as a Special Assistant Attorney General by the Attorney General of the State of Michigan.
  - (c) If Contractor does not deliver a Notice of Election relating to any claim of which it is notified by the State as provided above, the State may defend the claim in the manner as it may deem appropriate, at the cost and expense of Contractor. If it is determined that the claim was one against which Contractor was required to indemnify the State, upon request of the State, Contractor must promptly reimburse the State for all the reasonable costs and expenses.

**2.150 Termination/Cancellation**

**2.151 NOTICE AND RIGHT TO CURE**

If the Contractor breaches the contract, and the State in its sole discretion determines that the breach is curable, then the State shall provide the Contractor with written notice of the breach and a time period (not less than 30 days) to cure the Breach. The notice of breach and opportunity to cure is inapplicable for successive or repeated breaches or if the State determines in its sole discretion that the breach poses a serious and imminent threat to the health or safety of any person or the imminent loss, damage, or destruction of any real or tangible personal property.

**2.152 TERMINATION FOR CAUSE**

- (a) The State may terminate this contract, for cause, by notifying the Contractor in writing, if the Contractor (i) breaches any of its material duties or obligations under this Contract (including a Chronic Failure to meet any particular SLA), or (ii) fails to cure a breach within the time period specified in the written notice of breach provided by the State
- (b) If this Contract is terminated for cause, the Contractor must pay all costs incurred by the State in terminating this Contract, including but not limited to, State administrative costs, reasonable attorneys’ fees and court costs, and any reasonable additional costs the State may incur to procure the Services/Deliverables required by this Contract from other sources. Re-procurement costs are not consequential, indirect or incidental damages, and cannot be excluded by any other terms otherwise included in this Contract, provided the costs are not in excess of 50% more than the prices for the Service/Deliverables provided under this Contract.
- (c) If the State chooses to partially terminate this Contract for cause, charges payable under this Contract shall be equitably adjusted to reflect those Services/Deliverables that are terminated and the State must pay for all Services/Deliverables for which Final Acceptance has been granted



provided up to the termination date. Services and related provisions of this Contract that are terminated for cause must cease on the effective date of the termination.

- (d) If the State terminates this Contract for cause under this Section, and it is determined, for any reason, that Contractor was not in breach of contract under the provisions of this section, that termination for cause must be deemed to have been a termination for convenience, effective as of the same date, and the rights and obligations of the parties must be limited to that otherwise provided in this Contract for a termination for convenience.

**2.153 TERMINATION FOR CONVENIENCE**

The State may terminate this Contract for its convenience, in whole or part, if the State determines that a termination is in the State’s best interest. Reasons for the termination must be left to the sole discretion of the State and may include, but not necessarily be limited to (a) the State no longer needs the Services or products specified in the Contract, (b) relocation of office, program changes, changes in laws, rules, or regulations make implementation of the Services no longer practical or feasible, (c) unacceptable prices for Additional Services or New Work requested by the State, or (d) falsification or misrepresentation, by inclusion or non-inclusion, of information material to a response to any RFP issued by the State. The State may terminate this Contract for its convenience, in whole or in part, by giving Contractor written notice at least 30 days before the date of termination. If the State chooses to terminate this Contract in part, the charges payable under this Contract must be equitably adjusted to reflect those Services/Deliverables that are terminated. Services and related provisions of this Contract that are terminated for convenience must cease on the effective date of the termination.

**2.154 TERMINATION FOR NON-APPROPRIATION**

- (a) Contractor acknowledges that, if this Contract extends for several fiscal years, continuation of this Contract is subject to appropriation or availability of funds for this Contract. If funds to enable the State to effect continued payment under this Contract are not appropriated or otherwise made available, the State must terminate this Contract and all affected Statements of Work, in whole or in part, at the end of the last period for which funds have been appropriated or otherwise made available by giving written notice of termination to Contractor. The State must give Contractor at least 30 days advance written notice of termination for non-appropriation or unavailability (or the time as is available if the State receives notice of the final decision less than 30 days before the funding cutoff).
- (b) If funding for the Contract is reduced by law, or funds to pay Contractor for the agreed-to level of the Services or production of Deliverables to be provided by Contractor are not appropriated or otherwise unavailable, the State may, upon 30 days written notice to Contractor, reduce the level of the Services or change the production of Deliverables in the manner and for the periods of time as the State may elect. The charges payable under this Contract shall be equitably adjusted to reflect any equipment, services or commodities not provided by reason of the reduction.
- (c) If the State terminates this Contract, eliminates certain Deliverables, or reduces the level of Services to be provided by Contractor under this Section, the State must pay Contractor for all Work-in-Process performed through the effective date of the termination or reduction in level, as the case may be and as determined by the State, to the extent funds are available. This Section shall not preclude Contractor from reducing or stopping Services/Deliverables or raising against the State in a court of competent jurisdiction, any claim for a shortfall in payment for Services performed or Deliverables finally accepted before the effective date of termination.

**2.155 TERMINATION FOR CRIMINAL CONVICTION**

The State may terminate this Contract immediately and without further liability or penalty in the event Contractor, an officer of Contractor, or an owner of a 25% or greater share of Contractor is convicted of a criminal offense related to a State, public or private Contract or subcontract.

**2.156 TERMINATION FOR APPROVALS RESCINDED**

The State may terminate this Contract if any final administrative or judicial decision or adjudication disapproves a previously approved request for purchase of personal services under Constitution 1963, Article 11, § 5, and Civil Service Rule 7-1. In that case, the State shall pay the Contractor for only the



work completed to that point under the Contract. Termination may be in whole or in part and may be immediate as of the date of the written notice to Contractor or may be effective as of the date stated in the written notice.

**2.157 RIGHTS AND OBLIGATIONS UPON TERMINATION**

- (a) If the State terminates this Contract for any reason, the Contractor must (a) stop all work as specified in the notice of termination, (b) take any action that may be necessary, or that the State may direct, for preservation and protection of Deliverables or other property derived or resulting from this Contract that may be in Contractor’s possession, (c) return all materials and property provided directly or indirectly to Contractor by any entity, agent or employee of the State, (d) transfer title in, and deliver to, the State, unless otherwise directed, all Deliverables intended to be transferred to the State at the termination of the Contract and which are resulting from the Contract (which must be provided to the State on an “As-Is” basis except to the extent the amounts paid by the State in respect of the items included compensation to Contractor for the provision of warranty services in respect of the materials), and (e) take any action to mitigate and limit any potential damages, or requests for Contractor adjustment or termination settlement costs, to the maximum practical extent, including terminating or limiting as otherwise applicable those subcontracts and outstanding orders for material and supplies resulting from the terminated Contract.
- (b) If the State terminates this Contract before its expiration for its own convenience, the State must pay Contractor for all charges due for Services provided before the date of termination and, if applicable, as a separate item of payment under this Contract, for Work In Process, on a percentage of completion basis at the level of completion determined by the State. All completed or partially completed Deliverables prepared by Contractor under this Contract, at the option of the State, becomes the State’s property, and Contractor is entitled to receive equitable fair compensation for the Deliverables. Regardless of the basis for the termination, the State is not obligated to pay, or otherwise compensate, Contractor for any lost expected future profits, costs or expenses incurred with respect to Services not actually performed for the State.
- (c) Upon a good faith termination, the State may assume, at its option, any subcontracts and agreements for services and deliverables provided under this Contract, and may further pursue completion of the Services/Deliverables under this Contract by replacement contract or otherwise as the State may in its sole judgment deem expedient.

**2.158 RESERVATION OF RIGHTS**

Any termination of this Contract or any Statement of Work issued under it by a party must be with full reservation of, and without prejudice to, any rights or remedies otherwise available to the party with respect to any claims arising before or as a result of the termination.

**2.160 Termination by Contractor**

**2.161 TERMINATION BY CONTRACTOR**

If the State breaches the Contract, and the Contractor in its sole discretion determines that the breach is curable, then the Contractor will provide the State with written notice of the breach and a time period (not less than 30 days) to cure the breach. The Notice of Breach and opportunity to cure is inapplicable for successive and repeated breaches.

The Contractor may terminate this Contract if the State (i) materially breaches its obligation to pay the Contractor undisputed amounts due and owing under this Contract, (ii) breaches its other obligations under this Contract to an extent that makes it impossible or commercially impractical for the Contractor to perform the Services, or (iii) does not cure the breach within the time period specified in a written notice of breach. But the Contractor must discharge its obligations under **Section 2.160** before it terminates the Contract.



**2.170 Transition Responsibilities**

**2.171 CONTRACTOR TRANSITION RESPONSIBILITIES**

If the State terminates this contract, for convenience or cause, or if the Contract is otherwise dissolved, voided, rescinded, nullified, expires or rendered unenforceable, the Contractor shall comply with direction provided by the State to assist in the orderly transition of equipment, services, software, leases, etc. to the State or a third party designated by the State. If this Contract expires or terminates, the Contractor agrees to make all reasonable efforts to effect an orderly transition of services within a reasonable period of time that in no event will exceed 60 days. These efforts must include, but are not limited to, those listed in Section 2.150.

**2.172 CONTRACTOR PERSONNEL TRANSITION**

The Contractor shall work with the State, or a specified third party, to develop a transition plan setting forth the specific tasks and schedule to be accomplished by the parties, to effect an orderly transition. The Contractor must allow as many personnel as practicable to remain on the job to help the State, or a specified third party, maintain the continuity and consistency of the services required by this Contract. In addition, during or following the transition period, in the event the State requires the Services of the Contractor's subcontractors or vendors, as necessary to meet its needs, Contractor agrees to reasonably, and with good-faith, work with the State to use the Services of Contractor's subcontractors or vendors. Contractor will notify all of Contractor's subcontractors of procedures to be followed during transition.

**2.173 CONTRACTOR INFORMATION TRANSITION**

The Contractor shall provide reasonable detailed specifications for all Services/Deliverables needed by the State, or specified third party, to properly provide the Services/Deliverables required under this Contract. The Contractor will provide the State with asset management data generated from the inception of this Contract through the date on which this Contractor is terminated in a comma-delineated format unless otherwise requested by the State. The Contractor will deliver to the State any remaining owed reports and documentation still in Contractor's possession subject to appropriate payment by the State.

**2.174 CONTRACTOR SOFTWARE TRANSITION**

The Contractor shall reasonably assist the State in the acquisition of any Contractor software required to perform the Services/use the Deliverables under this Contract. This must include any documentation being used by the Contractor to perform the Services under this Contract. If the State transfers any software licenses to the Contractor, those licenses must, upon expiration of the Contract, transfer back to the State at their current revision level. Upon notification by the State, Contractor may be required to freeze all non-critical changes to Deliverables/Services.

**2.175 TRANSITION PAYMENTS**

If the transition results from a termination for any reason, the termination provisions of this Contract must govern reimbursement. If the transition results from expiration, the Contractor will be reimbursed for all reasonable transition costs (i.e. costs incurred within the agreed period after contract expiration that result from transition operations) at the rates agreed upon by the State. The Contractor will prepare an accurate accounting from which the State and Contractor may reconcile all outstanding accounts.

**2.176 STATE TRANSITION RESPONSIBILITIES**

In the event that this Contract is terminated, dissolved, voided, rescinded, nullified, or otherwise rendered unenforceable, the State agrees to reconcile all accounts between the State and the Contractor, complete any pending post-project reviews and perform any others obligations upon which the State and the Contractor agree.

- (a) Reconciling all accounts between the State and the Contractor;
- (b) Completing any pending post-project reviews.



**2.180 Stop Work**

**2.181 STOP WORK ORDERS**

The State may, at any time, by written Stop Work Order to Contractor, require that Contractor stop all, or any part, of the work called for by the Contract for a period of up to 90 calendar days after the Stop Work Order is delivered to Contractor, and for any further period to which the parties may agree. The Stop Work Order must be identified as a Stop Work Order and must indicate that it is issued under this **Section**. Upon receipt of the stop work order, Contractor must immediately comply with its terms and take all reasonable steps to minimize incurring costs allocable to the work covered by the Stop Work Order during the period of work stoppage. Within the period of the stop work order, the State must either: (a) cancel the stop work order; or (b) terminate the work covered by the Stop Work Order as provided in **Section 2.182**.

**2.182 CANCELLATION OR EXPIRATION OF STOP WORK ORDER**

The Contractor shall resume work if the State cancels a Stop Work Order or if it expires. The parties shall agree upon an equitable adjustment in the delivery schedule, the Contract price, or both, and the Contract shall be modified, in writing, accordingly, if: (a) the Stop Work Order results in an increase in the time required for, or in Contractor's costs properly allocable to, the performance of any part of the Contract; and (b) Contractor asserts its right to an equitable adjustment within 30 calendar days after the end of the period of work stoppage; provided that, if the State decides the facts justify the action, the State may receive and act upon a Contractor proposal submitted at any time before final payment under the Contract. Any adjustment will conform to the requirements of **Section 2.024**.

**2.183 ALLOWANCE OF CONTRACTOR COSTS**

If the Stop Work Order is not canceled and the work covered by the Stop Work Order is terminated for reasons other than material breach, the termination shall be deemed to be a termination for convenience under **Section 2.153**, and the State shall pay reasonable costs resulting from the Stop Work Order in arriving at the termination settlement. For the avoidance of doubt, the State shall not be liable to Contractor for loss of profits because of a Stop Work Order issued under this Section.

**2.190 Dispute Resolution**

**2.191 IN GENERAL**

Any claim, counterclaim, or dispute between the State and Contractor arising out of or relating to the Contract or any Statement of Work must be resolved as follows. For all Contractor claims seeking an increase in the amounts payable to Contractor under the Contract, or the time for Contractor's performance, Contractor must submit a letter, together with all data supporting the claims, executed by Contractor's Contract Administrator or the Contract Administrator's designee certifying that (a) the claim is made in good faith, (b) the amount claimed accurately reflects the adjustments in the amounts payable to Contractor or the time for Contractor's performance for which Contractor believes the State is liable and covers all costs of every type to which Contractor is entitled from the occurrence of the claimed event, and (c) the claim and the supporting data are current and complete to Contractor's best knowledge and belief.

**2.192 INFORMAL DISPUTE RESOLUTION**

(a) All disputes between the parties shall be resolved under the Contract Management procedures in this Contract. If the parties are unable to resolve any dispute after compliance with the processes, the parties must meet with the Director of Procurement, DTMB, or designee, to resolve the dispute without the need for formal legal proceedings, as follows:



- (1) The representatives of Contractor and the State must meet as often as the parties reasonably deem necessary to gather and furnish to each other all information with respect to the matter at issue which the parties believe to be appropriate and germane in connection with its resolution. The representatives shall discuss the problem and negotiate in good faith in an effort to resolve the dispute without the necessity of any formal proceeding.
- (2) During the course of negotiations, all reasonable requests made by one party to another for non-privileged information reasonably related to the Contract shall be honored in order that each of the parties may be fully advised of the other's position.
- (3) The specific format for the discussions shall be left to the discretion of the designated State and Contractor representatives, but may include the preparation of agreed upon statements of fact or written statements of position.
- (4) Following the completion of this process within 60 calendar days, the Director of Procurement, DTMB, or designee, shall issue a written opinion regarding the issue(s) in dispute within 30 calendar days. The opinion regarding the dispute must be considered the State's final action and the exhaustion of administrative remedies.
  - (b) This Section shall not be construed to prevent either party from instituting, and a party is authorized to institute, formal proceedings earlier to avoid the expiration of any applicable limitations period, to preserve a superior position with respect to other creditors, or under Section 2.193.
  - (c) The State shall not mediate disputes between the Contractor and any other entity, except state agencies, concerning responsibility for performance of work under the Contract.

**2.193 INJUNCTIVE RELIEF**

The only circumstance in which disputes between the State and Contractor shall not be subject to the provisions of **Section 2.192** is where a party makes a good faith determination that a breach of the terms of the Contract by the other party is that the damages to the party resulting from the breach shall be so immediate, so large or severe and so incapable of adequate redress after the fact that a temporary restraining order or other immediate injunctive relief is the only adequate remedy.

**2.194 CONTINUED PERFORMANCE**

Each party agrees to continue performing its obligations under the Contract while a dispute is being resolved except to the extent the issue in dispute precludes performance (dispute over payment must not be deemed to preclude performance) and without limiting either party's right to terminate the Contract as provided in **Section 2.150**, as the case may be.

**2.200 Federal and State Contract Requirements**

**2.201 NONDISCRIMINATION**

In the performance of the Contract, Contractor agrees not to discriminate against any employee or applicant for employment, with respect to his or her hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of race, color, religion, national origin, ancestry, age, sex, height, weight, and marital status, physical or mental disability. Contractor further agrees that every subcontract entered into for the performance of this Contract or any purchase order resulting from this Contract will contain a provision requiring non-discrimination in employment, as specified here, binding upon each Subcontractor. This covenant is required under the Elliot Larsen Civil Rights Act, 1976 PA 453, MCL 37.2101, et seq., and the Persons with Disabilities Civil Rights Act, 1976 PA 220, MCL 37.1101, et seq., and any breach of this provision may be regarded as a material breach of the Contract.

**2.202 UNFAIR LABOR PRACTICES**

Under 1980 PA 278, MCL 423.321, et seq., the State shall not award a Contract or subcontract to an employer whose name appears in the current register of employers failing to correct an unfair labor practice compiled under section 2 of the Act. This information is compiled by the United States National Labor Relations Board. A Contractor of the State, in relation to the Contract, shall not enter into a



contract with a Subcontractor, manufacturer, or supplier whose name appears in this register. Under section 4 of 1980 PA 278, MCL 423.324, the State may void any Contract if, after award of the Contract, the name of Contractor as an employer or the name of the Subcontractor, manufacturer or supplier of Contractor appears in the register.

**2.203 WORKPLACE SAFETY AND DISCRIMINATORY HARASSMENT**

In performing Services for the State, the Contractor shall comply with the Department of Civil Services Rule 2-20 regarding Workplace Safety and Rule 1-8.3 regarding Discriminatory Harassment. In addition, the Contractor shall comply with Civil Service regulations and any applicable agency rules provided to the Contractor. For Civil Service Rules, see <http://www.mi.gov/mdcs/0,1607,7-147-6877---,00.html>.

**2.204 PREVAILING WAGE**

Wages rates and fringe benefits to be paid each class of individuals employed by the Contractor, its subcontractors, their subcontractors, and all persons involved with the performance of this Contract in privity of contract with the Contractor shall not be less than the wage rates and fringe benefits established by the Michigan Department of Licensing and Regulatory Affairs, Wage and Hour Division, schedule of occupational classification and wage rates and fringe benefits for the local where the work is to be performed. The term Contractor shall include all general contractors, prime contractors, project managers, trade contractors, and all of their contractors or subcontractors and persons in privity of contract with them.

The Contractor, its subcontractors, their subcontractors and all persons involved with the performance of this contract in privity of contract with the Contractor shall keep posted on the work site, in a conspicuous place, a copy of all wage rates and fringe benefits as prescribed in the Contract. Contractor shall also post, in a conspicuous place, the address and telephone number of the Michigan Department of Licensing and Regulatory Affairs, the agency responsible for enforcement of the wage rates and fringe benefits. Contractor shall keep an accurate record showing the name and occupation of the actual wage and benefits paid to each individual employed in connection with this contract. This record shall be available to the State upon request for reasonable inspection.

If any trade is omitted from the list of wage rates and fringe benefits to be paid to each class of individuals by the Contractor, it is understood that the trades omitted shall also be paid not less than the wage rate and fringe benefits prevailing in the local where the work is to be performed.

**2.210 Governing Law**

**2.211 GOVERNING LAW**

The Contract shall in all respects be governed by, and construed according to, the substantive laws of the State of Michigan without regard to any Michigan choice of law rules that would apply the substantive law of any other jurisdiction to the extent not inconsistent with, or pre-empted by federal law.

**2.212 COMPLIANCE WITH LAWS**

Contractor shall comply with all applicable state, federal and local laws and ordinances in providing the Services/Deliverables.

**2.213 JURISDICTION**

Any dispute arising from the Contract shall be resolved in the State of Michigan. With respect to any claim between the parties, Contractor consents to venue in Ingham County, Michigan, and irrevocably waives any objections it may have to the jurisdiction on the grounds of lack of personal jurisdiction of the court or the laying of venue of the court or on the basis of forum non conveniens or otherwise. Contractor agrees to appoint agents in the State of Michigan to receive service of process.



**2.220 Limitation of Liability**

**2.221 LIMITATION OF LIABILITY**

Neither the Contractor nor the State shall be liable to each other, regardless of the form of action, for consequential, incidental, indirect, or special damages. This limitation of liability does not apply to claims for infringement of United States patent, copyright, trademark or trade secrets; to claims for personal injury or damage to property caused by the gross negligence or willful misconduct of the Contractor; to claims covered by other specific provisions of this Contract calling for liquidated damages; or to court costs or attorney’s fees awarded by a court in addition to damages after litigation based on this Contract.

The Contractor’s liability for damages to the State is limited to two times the value of the Contract or \$500,000 whichever is higher. The foregoing limitation of liability does not apply to claims for infringement of United States patent, copyright, trademarks or trade secrets; to claims for personal injury or damage to property caused by the gross negligence or willful misconduct of the Contractor; to claims covered by other specific provisions of this Contract calling for liquidated damages; or to court costs or attorney’s fees awarded by a court in addition to damages after litigation based on this Contract.

The State’s liability for damages to the Contractor is limited to the value of the Contract.

**2.230 Disclosure Responsibilities**

**2.231 DISCLOSURE OF LITIGATION**

Contractor shall disclose any material criminal litigation, investigations or proceedings involving the Contractor (and each Subcontractor) or any of its officers or directors or any litigation, investigations or proceedings under the Sarbanes-Oxley Act. In addition, each Contractor (and each Subcontractor) shall notify the State of any material civil litigation, arbitration or proceeding which arises during the term of the Contract and extensions, to which Contractor (or, to the extent Contractor is aware, any Subcontractor) is a party, and which involves: (i) disputes that might reasonably be expected to adversely affect the viability or financial stability of Contractor or any Subcontractor; or (ii) a claim or written allegation of fraud against Contractor or, to the extent Contractor is aware, any Subcontractor by a governmental or public entity arising out of their business dealings with governmental or public entities. The Contractor shall disclose in writing to the Contract Administrator any litigation, investigation, arbitration or other proceeding (collectively, "Proceeding") within 30 days of its occurrence. Details of settlements that are prevented from disclosure by the terms of the settlement may be annotated. Information provided to the State from Contractor’s publicly filed documents referencing its material litigation shall be deemed to satisfy the requirements of this Section.

If any Proceeding disclosed to the State under this Section, or of which the State otherwise becomes aware, during the term of this Contract would cause a reasonable party to be concerned about:

- (a) the ability of Contractor (or a Subcontractor) to continue to perform this Contract according to its terms and conditions, or
- (b) whether Contractor (or a Subcontractor) in performing Services for the State is engaged in conduct which is similar in nature to conduct alleged in the Proceeding, which conduct would constitute a breach of this Contract or a violation of Michigan law, regulations or public policy, then the Contractor must provide the State all reasonable assurances requested by the State to demonstrate that:
  - (1) Contractor and its Subcontractors will be able to continue to perform this Contract and any Statements of Work according to its terms and conditions, and
  - (2) Contractor and its Subcontractors have not and will not engage in conduct in performing the Services which is similar in nature to the conduct alleged in the Proceeding.
- (c) Contractor shall make the following notifications in writing:



- (1) Within 30 days of Contractor becoming aware that a change in its ownership or officers has occurred, or is certain to occur, or a change that could result in changes in the valuation of its capitalized assets in the accounting records, Contractor must notify DTMB-Procurement.
- (2) Contractor shall also notify DTMB Procurement within 30 days whenever changes to asset valuations or any other cost changes have occurred or are certain to occur as a result of a change in ownership or officers.
- (3) Contractor shall also notify DTMB-Procurement within 30 days whenever changes to company affiliations occur.

**2.232 CALL CENTER DISCLOSURE**

Contractor and/or all subcontractors involved in the performance of this Contract providing call or contact center services to the State shall disclose the location of its call or contact center services to inbound callers. Failure to disclose this information is a material breach of this Contract.

**2.233 BANKRUPTCY**

The State may, without prejudice to any other right or remedy, terminate this Contract, in whole or in part, and, at its option, may take possession of the “Work in Process” and finish the Works in Process by whatever appropriate method the State may deem expedient if:

- (a) the Contractor files for protection under the bankruptcy laws;
- (b) an involuntary petition is filed against the Contractor and not removed within 30 days;
- (c) the Contractor becomes insolvent or if a receiver is appointed due to the Contractor's insolvency;
- (d) the Contractor makes a general assignment for the benefit of creditors; or
- (e) the Contractor or its affiliates are unable to provide reasonable assurances that the Contractor or its affiliates can deliver the services under this Contract.

Contractor will fix appropriate notices or labels on the Work in Process to indicate ownership by the State. To the extent reasonably possible, materials and Work in Process shall be stored separately from other stock and marked conspicuously with labels indicating ownership by the State.

**2.240 Performance**

**2.241 TIME OF PERFORMANCE**

- (a) Contractor shall use commercially reasonable efforts to provide the resources necessary to complete all Services and Deliverables according to the time schedules contained in the Statements of Work and other Exhibits governing the work, and with professional quality.
- (b) Without limiting the generality of **Section 2.241**, Contractor shall notify the State in a timely manner upon becoming aware of any circumstances that may reasonably be expected to jeopardize the timely and successful completion of any Deliverables/Services on the scheduled due dates in the latest State-approved delivery schedule and must inform the State of the projected actual delivery date.
- (c) If the Contractor believes that a delay in performance by the State has caused or will cause the Contractor to be unable to perform its obligations according to specified Contract time periods, the Contractor must notify the State in a timely manner and must use commercially reasonable efforts to perform its obligations according to the Contract time periods notwithstanding the State's failure. Contractor will not be in default for a delay in performance to the extent the delay is caused by the State.

**2.242 SERVICE LEVEL AGREEMENT (SLA)**

- (a) SLAs will be completed with the following operational considerations:
  - (1) SLAs will not be calculated for individual Incidents where any event of Excusable Failure has been determined; Incident means any interruption in Services.



- (2) SLAs will not be calculated for individual Incidents where loss of service is planned and where the State has received prior notification or coordination.
- (3) SLAs will not apply if the applicable Incident could have been prevented through planning proposed by Contractor and not implemented at the request of the State. To invoke this consideration, complete documentation relevant to the denied planning proposal must be presented to substantiate the proposal.
- (4) Time period measurements will be based on the time Incidents are received by the Contractor and the time that the State receives notification of resolution based on 24x7x365 time period, except that the time period measurement will be suspended based on the following:
  - (i) Time period(s) will not apply where Contractor does not have access to a physical State Location and where access to the State Location is necessary for problem identification and resolution.
  - (ii) Time period(s) will not apply where Contractor needs to obtain timely and accurate information or appropriate feedback and is unable to obtain timely and accurate information or appropriate feedback from the State.
- (b) Chronic Failure for any Service(s) will be defined as three unscheduled outage(s) or interruption(s) on any individual Service for the same reason or cause or if the same reason or cause was reasonably discoverable in the first instance over a rolling 30 day period. Chronic Failure will result in the State's option to terminate the effected individual Service(s) and procure them from a different vendor for the chronic location(s) with Contractor to pay the difference in charges for up to three additional months. The termination of the Service will not affect any tiered pricing levels.
- (c) Root Cause Analysis will be performed on any Business Critical outage(s) or outage(s) on Services when requested by the Contract Administrator. Contractor will provide its analysis within two weeks of outage(s) and provide a recommendation for resolution.
- (d) All decimals must be rounded to two decimal places with five and greater rounding up and four and less rounding down unless otherwise specified.

**2.243 LIQUIDATED DAMAGES**

The parties acknowledge that late or improper completion of the Work will cause loss and damage to the State, and that it would be impracticable and extremely difficult to fix the actual damage sustained by the State as a result. Therefore, Contractor and the State agree that if there is late or improper completion of the Work and the State does not elect to exercise its rights under **Section 2.152**, the State is entitled to collect liquidated damages in the amount of **\$5,000.00** and an additional **\$100.00** per day for each day Contractor fails to remedy the late or improper completion of the Work.

**Unauthorized Removal of any Key Personnel**

It is acknowledged that an Unauthorized Removal will interfere with the timely and proper completion of the Contract, to the loss and damage of the State, and that it would be impracticable and extremely difficult to fix the actual damage sustained by the State as a result of any Unauthorized Removal. Therefore, Contractor and the State agree that in the case of any Unauthorized Removal in respect of which the State does not elect to exercise its rights under **Section 2.152**, the State may assess liquidated damages against Contractor as specified below.

For the Unauthorized Removal of any Key Personnel designated in the applicable Statement of Work, the liquidated damages amount is \$25,000.00 per individual if the Contractor identifies a replacement approved by the State under **Section 2.060** and assigns the replacement to the Project to shadow the Key Personnel who is leaving for a period of at least 30 days before the Key Personnel's removal.

If Contractor fails to assign a replacement to shadow the removed Key Personnel for at least 30 days, in addition to the \$25,000.00 liquidated damages for an Unauthorized Removal, Contractor must pay the amount of \$833.33 per day for each day of the 30 day shadow period that the replacement Key Personnel does not shadow the removed Key Personnel, up to \$25,000.00 maximum per individual. The total liquidated damages that may be assessed per Unauthorized Removal and failure to provide 30 days of shadowing must not exceed \$50,000.00 per individual.



**2.244 EXCUSABLE FAILURE**

Neither party will be liable for any default, damage or delay in the performance of its obligations under the Contract to the extent the default, damage or delay is caused by government regulations or requirements (executive, legislative, judicial, military or otherwise), power failure, electrical surges or current fluctuations, lightning, earthquake, war, water or other forces of nature or acts of God, delays or failures of transportation, equipment shortages, suppliers' failures, or acts or omissions of common carriers, fire; riots, civil disorders; strikes or other labor disputes, embargoes; injunctions (provided the injunction was not issued as a result of any fault or negligence of the party seeking to have its default or delay excused); or any other cause beyond the reasonable control of a party; provided the non-performing party and its Subcontractors are without fault in causing the default or delay, and the default or delay could not have been prevented by reasonable precautions and cannot reasonably be circumvented by the non-performing party through the use of alternate sources, workaround plans or other means, including disaster recovery plans.

If a party does not perform its contractual obligations for any of the reasons listed above, the non-performing party will be excused from any further performance of its affected obligation(s) for as long as the circumstances prevail. But the party must use commercially reasonable efforts to recommence performance whenever and to whatever extent possible without delay. A party must promptly notify the other party in writing immediately after the excusable failure occurs, and also when it abates or ends.

If any of the above-enumerated circumstances substantially prevent, hinder, or delay the Contractor's performance of the Services/provision of Deliverables for more than 10 Business Days, and the State determines that performance is not likely to be resumed within a period of time that is satisfactory to the State in its reasonable discretion, then at the State's option: (a) the State may procure the affected Services/Deliverables from an alternate source, and the State is not be liable for payment for the unperformed Services/ Deliverables not provided under the Contract for so long as the delay in performance continues; (b) the State may terminate any portion of the Contract so affected and the charges payable will be equitably adjusted to reflect those Services/Deliverables terminated; or (c) the State may terminate the affected Statement of Work without liability to Contractor as of a date specified by the State in a written notice of termination to the Contractor, except to the extent that the State must pay for Services/Deliverables provided through the date of termination.

The Contractor will not have the right to any additional payments from the State as a result of any Excusable Failure occurrence or to payments for Services not rendered/Deliverables not provided as a result of the Excusable Failure condition. Defaults or delays in performance by Contractor which are caused by acts or omissions of its Subcontractors will not relieve Contractor of its obligations under the Contract except to the extent that a Subcontractor is itself subject to an Excusable Failure condition described above and Contractor cannot reasonably circumvent the effect of the Subcontractor's default or delay in performance through the use of alternate sources, workaround plans or other means.

**2.250 Approval of Deliverables**

**2.251 DELIVERY OF DELIVERABLES**

A list of the Deliverables to be prepared and delivered by Contractor including, for each Deliverable, the scheduled delivery date is attached, if applicable to the individual Statement of Work. All Deliverables shall be completed and delivered for State review and written approval and, where applicable, installed in accordance with the State-approved delivery schedule and any other applicable terms and conditions of this Contract.

Prior to delivering any Deliverable to the State, Contractor will first perform all required quality assurance activities, and System Testing to verify that the Deliverable is complete and in conformance with its specifications. Before delivering a Deliverable to the State, Contractor shall certify to the State that (1) it



has performed such quality assurance activities, (2) it has performed any applicable testing, (3) it has corrected all material deficiencies discovered during such quality assurance activities and testing, (4) the Deliverable is in a suitable state of readiness for the State’s review and approval, and (5) the Deliverable/Service has all Critical Security patches/updates applied.

In discharging its obligations under this Section, Contractor shall be at all times (except where the parties agree otherwise in writing) in compliance with Level 3 of the Software Engineering Institute’s Capability Maturity Model for Software (“CMM Level 3”) or its equivalent.

**2.252 CONTRACTOR SYSTEM TESTING FOR DATA AS A SERVICE – ATTACHMENT C**

Contractor will be responsible for System Testing in Contractor’s development environment prior to turning over the Deliverable to the State for User Acceptance Testing and approval. Contractor’s System Testing shall include the following, at a minimum, plus any other testing required by CMM Level 3 or Contractor’s system development methodology:

Contractor will be responsible for performing Unit Testing and incremental Integration Testing of the components of each Deliverable.

Contractor’s System Testing will also include Integration Testing of each Deliverable to ensure proper inter-operation with all prior Deliverables, interfaces and other components that are intended to inter-operate with such Deliverable, and will include Regression Testing, volume and stress testing to ensure that the Deliverables are able to meet the State’s projected growth in the number and size of transactions to be processed by the Application and number of users, as such projections are set forth in the applicable Statement of Work.

Contractor’s System Testing will also include Business Function Testing and Technical Testing of each Application in a simulated production environment. Business Function Testing will include testing of full work streams that flow through the Application as the Application will be incorporated within the State’s computing environment. The State shall participate in and provide support for the Business Function Testing to the extent reasonably requested by Contractor. Within ten (10) days before the commencement of Business Function Testing pursuant to this Section, Contractor shall provide the State for State review and written approval Contractor’s test plan for Business Function Testing.

Within five (5) Business Days following the completion of System Testing pursuant to this **Section**, Contractor shall provide to the State a testing matrix establishing that testing for each condition identified in the System Testing plans has been conducted and successfully concluded. To the extent that testing occurs on State premises, the State shall be entitled to observe or otherwise participate in testing under this Section as the State may elect.

**2.253 APPROVAL OF DELIVERABLES, IN GENERAL**

All Deliverables (Written Deliverables and Custom Software Deliverables) require formal written approval by the State, in accordance with the following procedures. Formal approval by the State requires that the Deliverable be confirmed in writing by the State to meet its specifications. The parties acknowledge that the approval process set forth herein will be facilitated by ongoing consultation between the parties, visibility of interim and intermediate Deliverables and collaboration on key decisions.

The State’s obligation to comply with any State Review Period is conditioned on the timely delivery of Deliverables being reviewed. If Contractor fails to provide a Deliverable to the State in a timely manner, the State will nevertheless use commercially reasonable efforts to complete its review or testing within the applicable State Review Period.

Before commencement of its review or testing of a Deliverable, the State may inspect the Deliverable to confirm that all components of the Deliverable (e.g., software, associated documentation, and other materials) have been delivered. If the State determines that the Deliverable is incomplete, the State may refuse delivery of the Deliverable without performing any further inspection or testing of the Deliverable.



Otherwise, the review period will be deemed to have started on the day the State receives the Deliverable and the applicable certification by Contractor in accordance with this Section.

The State will approve in writing a Deliverable upon confirming that it conforms to and performs in accordance with, its specifications without material deficiency. The State may, but shall not be required to, conditionally approve in writing a Deliverable that contains material deficiencies if the State elects to permit Contractor to rectify them post-approval. In any case, Contractor will be responsible for working diligently to correct within a reasonable time at Contractor's expense all deficiencies in the Deliverable that remain outstanding at the time of State approval.

If, after three (3) opportunities (the original and two repeat efforts), Contractor is unable to correct all deficiencies preventing State approval of a Deliverable, the State may: (i) demand that Contractor cure the failure and give Contractor additional time to cure the failure at the sole expense of Contractor; or (ii) keep this Contract in force and do, either itself or through other parties, whatever Contractor has failed to do, in which event Contractor shall bear any excess expenditure incurred by the State in so doing beyond the contract price for such Deliverable and will pay the State an additional sum equal to ten percent (10%) of such excess expenditure to cover the State's general expenses without the need to furnish proof in substantiation of such general expenses; or (iii) terminate this Contract for default, either in whole or in part by notice to Contractor (and without the need to afford Contractor any further opportunity to cure). Notwithstanding the foregoing, the State shall not use, as a basis for exercising its termination rights under this Section, deficiencies discovered in a repeat State Review Period that could reasonably have been discovered during a prior State Review Period.

The State, at any time and in its own discretion, may halt the UAT or approval process if such process reveals deficiencies in or problems with a Deliverable in a sufficient quantity or of a sufficient severity as to make the continuation of such process unproductive or unworkable. In such case, the State may return the applicable Deliverable to Contractor for correction and re-delivery prior to resuming the review or UAT process and, in that event, Contractor will correct the deficiencies in such Deliverable in accordance with the Contract, as the case may be.

Approval in writing of a Deliverable by the State shall be provisional; that is, such approval shall not preclude the State from later identifying deficiencies in, and declining to accept, a subsequent Deliverable based on or which incorporates or inter-operates with an approved Deliverable, to the extent that the results of subsequent review or testing indicate the existence of deficiencies in the subsequent Deliverable, or if the Application of which the subsequent Deliverable is a component otherwise fails to be accepted pursuant to **Section 2.080**.

**2.254 PROCESS FOR APPROVAL OF WRITTEN DELIVERABLES**

The State Review Period for Written Deliverables will be the number of days set forth in the applicable Statement of Work following delivery of the final version of the Written Deliverable (failing which the State Review Period, by default, shall be five (5) Business Days for Written Deliverables of one hundred (100) pages or less and ten (10) Business Days for Written Deliverables of more than one hundred (100) pages). The duration of the State Review Periods will be doubled if the State has not had an opportunity to review an interim draft of the Written Deliverable prior to its submission to the State. The State agrees to notify Contractor in writing by the end of the State Review Period either stating that the Written Deliverable is approved in the form delivered by Contractor or describing any deficiencies that shall be corrected prior to approval of the Written Deliverable (or at the State's election, subsequent to approval of the Written Deliverable). If the State delivers to Contractor a notice of deficiencies, Contractor will correct the described deficiencies and within five (5) Business Days resubmit the Deliverable in a form that shows all revisions made to the original version delivered to the State. Contractor's correction efforts will be made at no additional charge. Upon receipt of a corrected Written Deliverable from Contractor, the State will have a reasonable additional period of time, not to exceed the length of the original State Review Period, to review the corrected Written Deliverable to confirm that the identified deficiencies have been corrected.



**2.255 PROCESS FOR APPROVAL OF CUSTOM SOFTWARE DELIVERABLES – DELETED/NA**

**2.256 FINAL ACCEPTANCE**

“Final Acceptance” shall be considered to occur when the Solution Deliverable to be delivered has been approved by the State and has been operating in production without any material deficiency for fourteen (14) consecutive days. If the State elects to defer putting a Custom Software Deliverable into live production for its own reasons, not based on concerns about outstanding material deficiencies in the Deliverable, the State shall nevertheless grant Final Acceptance of the Project.

**2.260 Ownership**

**2.261 OWNERSHIP OF WORK PRODUCT BY STATE**

With the exception of Data, which is addressed in Article 1.104, ~~The~~ State owns all Deliverables, as they are work made for hire by the Contractor for the State. The State owns all United States and international copyrights, trademarks, patents or other proprietary rights in the Deliverables.

**2.262 VESTING OF RIGHTS**

With the sole exception of any preexisting licensed works identified in the SOW and Data as it is addressed in Section 1.104, the Contractor assigns, and upon creation of each Deliverable automatically assigns, to the State, ownership of all United States and international copyrights, trademarks, patents, or other proprietary rights in each and every Deliverable, whether or not registered by the Contractor, insofar as any the Deliverable, by operation of law, may not be considered work made for hire by the Contractor for the State. From time to time upon the State’s request, the Contractor must confirm the assignment by execution and delivery of the assignments, confirmations of assignment, or other written instruments as the State may request. The State may obtain and hold in its own name all copyright, trademark, and patent registrations and other evidence of rights that may be available for Deliverables.

**2.263 RIGHTS IN DATA**

-The Contractor will not use the data for any purpose other than providing the Services, nor will any part of the data be disclosed, sold, assigned, leased or otherwise disposed of to the general public or to specific third parties or commercially exploited by or on behalf of the Contractor, except as allowed under this Contract. No employees of the Contractor, other than those on a strictly need-to-know basis, have access to the data. Contractor will not possess or assert any lien or other right against the data. Without limiting the generality of this Section, the Contractor must only use personally identifiable information as strictly necessary to provide the Services and must disclose the information only to its employees who have a strict need-to-know the information. The Contractor must comply at all times with all laws and regulations applicable to the personally identifiable information.

The State is the owner of all State-specific data under the Contract. The State may use the data provided by the Contractor for any purpose. The State will not possess or assert any lien or other right against the Contractor’s data. Without limiting the generality of this Section, the State may use personally identifiable information only as strictly necessary to utilize the Services and must disclose the information only to its employees who have a strict need to know the information, except as provided by law. The State must comply at all times with all laws and regulations applicable to the personally identifiable information. Other material developed and provided to the State remains the State’s sole and exclusive property.

**2.264 OWNERSHIP OF MATERIALS**

The State and the Contractor will continue to own their respective proprietary technologies developed before entering into the Contract. Any hardware bought through the Contractor by the State, and paid for by the State, will be owned by the State. Any software licensed through the Contractor and sold to the State, will be licensed directly to the State.



**2.270 State Standards**

**2.271 EXISTING TECHNOLOGY STANDARDS - REFER TO 1.103.**

**2.272 ACCEPTABLE USE POLICY**

To the extent that Contractor has access to the State computer system, Contractor must comply with the State's Acceptable Use Policy, see [http://michigan.gov/cybersecurity/0,1607,7-217-34395\\_34476---.00.html](http://michigan.gov/cybersecurity/0,1607,7-217-34395_34476---.00.html). All Contractor employees must be required, in writing, to agree to the State's Acceptable Use Policy before accessing the State system. The State reserves the right to terminate Contractor's access to the State system if a violation occurs.

**2.273 SYSTEMS CHANGES**

Contractor is not responsible for and not authorized to make changes to any State systems without written authorization from the Project Manager. Any changes Contractor makes to State systems with the State's approval must be done according to applicable State procedures, including security, access and configuration management procedures.

**2.280 Extended Purchasing**

A. 2.281 DELETED/NA

**2.282 STATE EMPLOYEE PURCHASES – DELETED/NA**

**2.283 COOPERATIVE PURCHASING**

- (a) This Contract may be extended to additional States or governmental jurisdictions upon mutual written agreement between the State of Michigan and the Contractor. Political subdivisions and other authorized entities within each participating State or governmental jurisdiction may also participate in this Contract if such State allows participation by such entities.
- (b) All MiDEAL processes, invoicing relationships, reporting and MiDEAL Service Fee also apply to cooperative purchasing participants.
- (c) The State of Michigan reserves the right to negotiate additional discounts based on any increased volume generated by such extensions.

**2.290 Environmental Provision**

**2.291 ENVIRONMENTAL PROVISION**

**Hazardous Materials:** For the purposes of this Section, "Hazardous Materials" is a generic term used to describe asbestos, ACBMs, PCBs, petroleum products, construction materials including paint thinners, solvents, gasoline, oil, and any other material the manufacture, use, treatment, storage, transportation or disposal of which is regulated by the federal, state or local laws governing the protection of the public health, natural resources or the environment. This includes, but is not limited to, materials the as batteries and circuit packs, and other materials that are regulated as (1) "Hazardous Materials" under the Hazardous Materials Transportation Act, (2) "chemical hazards" under the Occupational Safety and Health Administration standards, (3) "chemical substances or mixtures" under the Toxic Substances



Control Act, (4) “pesticides” under the Federal Insecticide Fungicide and Rodenticide Act, and (5) “hazardous wastes” as defined or listed under the Resource Conservation and Recovery Act.

- (a) The Contractor shall use, handle, store, dispose of, process, transport and transfer any material considered a Hazardous Material according to all federal, State and local laws. The State shall provide a safe and suitable environment for performance of Contractor’s Work. Before the commencement of Work, the State shall advise the Contractor of the presence at the work site of any Hazardous Material to the extent that the State is aware of the Hazardous Material. If the Contractor encounters material reasonably believed to be a Hazardous Material and which may present a substantial danger, the Contractor shall immediately stop all affected Work, notify the State in writing about the conditions encountered, and take appropriate health and safety precautions.
- (b) Upon receipt of a written notice, the State will investigate the conditions. If (a) the material is a Hazardous Material that may present a substantial danger, and (b) the Hazardous Material was not brought to the site by the Contractor, or does not result in whole or in part from any violation by the Contractor of any laws covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Materials, the State shall order a suspension of Work in writing. The State shall proceed to have the Hazardous Material removed or rendered harmless. In the alternative, the State shall terminate the affected Work for the State’s convenience.
- (c) Once the Hazardous Material has been removed or rendered harmless by the State, the Contractor shall resume Work as directed in writing by the State. Any determination by the Michigan Department of Community Health or the Michigan Department of Environmental Quality that the Hazardous Material has either been removed or rendered harmless is binding upon the State and Contractor for the purposes of resuming the Work. If any incident with Hazardous Material results in delay not reasonable anticipatable under the circumstances and which is attributable to the State, the applicable SLAs for the affected Work will not be counted in a time as mutually agreed by the parties.
- (d) If the Hazardous Material was brought to the site by the Contractor, or results in whole or in part from any violation by the Contractor of any laws covering the use, handling, storage, disposal of, processing, transport and transfer of Hazardous Material, or from any other act or omission within the control of the Contractor, the Contractor shall bear its proportionate share of the delay and costs involved in cleaning up the site and removing and rendering harmless the Hazardous Material according to Applicable Laws to the condition approved by applicable regulatory agency(ies).

**Refrigeration and Air Conditioning:** The Contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 U.S.C. 7671g and 7671h) as each or both apply to this contract.

**Environmental Performance:** Waste Reduction Program - Contractor shall establish a program to promote cost-effective waste reduction in all operations and facilities covered by this contract. The Contractor’s programs shall comply with applicable Federal, State, and local requirements, specifically including Section 6002 of the Resource Conservation and Recovery Act (42 U.S.C. 6962, et seq.).

**2.300 Deliverables**

**2.301 SOFTWARE**

A list of the items of software the State is required to purchase for executing the Contract is attached. The list includes all software required to complete the Contract and make the Deliverables operable; if any additional software is required in order for the Deliverables to meet the requirements of this Contract, such software shall be provided to the State by Contractor at no additional charge (except where agreed upon and specified in a Statement of Work or Contract Change Notice). The attachment also identifies certain items of software to be provided by the State.



**2.302 HARDWARE**

A list of the items of hardware the State is required to purchase for executing the Contract is attached. The list includes all hardware required to complete the Contract and make the Deliverables operable; if any additional hardware is required in order for the Deliverables to meet the requirements of this Contract, such hardware shall be provided to the State by Contractor at no additional charge (except where agreed upon and specified in a Contract Change Notice). The attachment also identifies certain items of hardware to be provided by the State.

**2.310 Software Warranties**

**2.311 PERFORMANCE WARRANTY**

The Contractor represents and warrants that Deliverables, after Final Acceptance, will perform and operate in compliance with the requirements and other standards of performance contained in this Contract (including all descriptions, specifications and drawings made a part of the Contract) for a period of (30) thirty days. In the event of a breach of this warranty, Contractor will promptly correct the affected Deliverable(s) at no charge to the State.

**2.312 NO SURREPTITIOUS CODE WARRANTY**

The Contractor represents and warrants that no copy of licensed Software provided to the State contains or will contain any Self-Help Code or any Unauthorized Code as defined below. This warranty is referred to in this Contract as the “No Surreptitious Code Warranty.”

As used in this Contract, “Self-Help Code” means any back door, time bomb, drop dead device, or other software routine designed to disable a computer program automatically with the passage of time or under the positive control of a person other than the licensee of the software. Self-Help Code does not include Software routines in a computer program, if any, designed to permit an owner of the computer program (or other person acting by authority of the owner) to obtain access to a licensee’s computer system(s) (e.g. remote access via modem) for purposes of maintenance or technical support.

As used in this Contract, “Unauthorized Code” means any virus, Trojan horse, spyware, worm or other Software routines or components designed to permit unauthorized access to disable, erase, or otherwise harm software, equipment, or data; or to perform any other such actions. The term Unauthorized Code does not include Self-Help Code. Unauthorized Code does not include Software routines in a computer program, if any, designed to permit an owner of the computer program (or other person acting by authority of the owner) to obtain access to a licensee’s computer system(s) (e.g. remote access via modem) for purposes of maintenance or technical support.

In addition, Contractor will use up-to-date commercial virus detection software to detect and remove any viruses from any software prior to delivering it to the State.

**2.313 CALENDAR WARRANTY – DELETED/NA**

**2.314 THIRD-PARTY SOFTWARE WARRANTY**

The Contractor represents and warrants that it will disclose the use or incorporation of any third-party software into the Deliverables. At the time of Delivery, the Contractor shall provide in writing the name and use of any Third-party Software, including information regarding the Contractor’s authorization to include and utilize such software. The notice shall include a copy of any ownership agreement or license that authorizes the Contractor to use the Third-party Software.

**2.315 PHYSICAL MEDIA WARRANTY**

Contractor represents and warrants that each licensed copy of the Software provided by the Contractor is free from physical defects in the media that tangibly embodies the copy. This warranty does not apply to



defects discovered more than (30) thirty days after that date of Final Acceptance of the Software by the State. This warranty does not apply to defects arising from acts of Excusable Failure. If the Contractor breaches this warranty, then the State shall be entitled to replacement of the non-compliant copy by Contractor, at Contractor's expense (including shipping and handling).

**2.320 Software Licensing – Deleted/NA**

**2.330 Source Code Escrow – Deleted/NA**



**Glossary**

Days	Means calendar days unless otherwise specified.
24x7x365	Means 24 hours a day, seven days a week, and 365 days a year (including the 366th day in a leap year).
Additional Service	Means any Services/Deliverables within the scope of the Contract, but not specifically provided under any Statement of Work, that once added will result in the need to provide the Contractor with additional consideration.
Audit Period	See Section 2.110
Business Day	Whether capitalized or not, shall mean any day other than a Saturday, Sunday or State-recognized legal holiday (as identified in the Collective Bargaining Agreement for State employees) from 8:00am EST through 5:00pm EST unless otherwise stated.
Blanket Purchase Order	An alternate term for Contract as used in the States computer system.
Business Critical	Any function identified in any Statement of Work as Business Critical.
Chronic Failure	Defined in any applicable Service Level Agreements.
Deliverable	Physical goods and/or commodities as required or identified by a Statement of Work
DTMB	Michigan Department of Technology, Management and Budget
Environmentally preferable products	A product or service that has a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. Such products or services may include, but are not limited to, those that contain recycled content, minimize waste, conserve energy or water, and reduce the amount of toxics either disposed of or consumed.
Excusable Failure	See Section 2.244.
Hazardous material	Any material defined as hazardous under the latest version of federal Emergency Planning and Community Right-to-Know Act of 1986 (including revisions adopted during the term of the Contract).
Incident	Any interruption in Services.
ITB	A generic term used to describe an Invitation to Bid. The ITB serves as the document for transmitting the RFP to potential bidders
Key Personnel	Any Personnel designated in Article 1 as Key Personnel.
New Work	Any Services/Deliverables outside the scope of the Contract and not specifically provided under any Statement of Work, that once added will result in the need to provide the Contractor with additional consideration.
Ozone-depleting substance	Any substance the Environmental Protection Agency designates in 40 CFR part 82 as: (1) Class I, including, but not limited to, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform; or (2) Class II, including, but not limited to, hydro chlorofluorocarbons
Partner	In regards to this RFP and any resulting contract. The State reserves the right to create partnerships with non-State entities at it's discretion. For example, a partnership may be entered into with: any Federal, State, or Local unit of Government. Including, but not limited to, any Michigan County, City, Township, Village, or Regional Organization of Governments.
Post-Consumer Waste	Any product generated by a business or consumer which has served its intended end use, and which has been separated or diverted from solid waste for the purpose of recycling into a usable commodity or product, and which does not include post-industrial waste.
Post-Industrial Waste	Industrial by-products that would otherwise go to disposal and wastes generated after completion of a manufacturing process, but do not include internally generated scrap commonly returned to industrial or manufacturing processes.
Project	A specific engagement for Services under this Contract, defined through the



	State issuing a Statement of Work and the vendor submitting a Task Proposal.
Recycling	The series of activities by which materials that are no longer useful to the generator are collected, sorted, processed, and converted into raw materials and used in the production of new products. This definition excludes the use of these materials as a fuel substitute or for energy production.
Deleted – Not Applicable	Section is not applicable or included in this RFP. This is used as a placeholder to maintain consistent numbering.
Reuse	Using a product or component of municipal solid waste in its original form more than once.
RFP	Request for Proposal designed to solicit proposals for services
Services	Any function performed for the benefit of the State.
Source reduction	Any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment prior to recycling, energy recovery, treatment, or disposal.
State Location	Any physical location where the State performs work. State Location may include state-owned, leased, or rented space.
Subcontractor	A company Contractor delegates performance of a portion of the Services to, but does not include independent contractors engaged by Contractor solely in a staff augmentation role.
Unauthorized Removal	Contractor’s removal of Key Personnel without the prior written consent of the State.
Waste prevention	Source reduction and reuse, but not recycling.
Waste reduction and Pollution prevention	The practice of minimizing the generation of waste at the source and, when wastes cannot be prevented, utilizing environmentally sound on-site or off-site reuse and recycling. The term includes equipment or technology modifications, process or procedure modifications, product reformulation or redesign, and raw material substitutions. Waste treatment, control, management, and disposal are not considered pollution prevention, per the definitions under Part 143, Waste Minimization, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended.
Work in Progress	A Deliverable that has been partially prepared, but has not been presented to the State for Approval.
Work Product	Refers to any data compilations, reports, and other media, materials, or other objects or works of authorship created or produced by the Contractor as a result of an in furtherance of performing the services required by this Contract.



## Attachment A: State of Michigan Imagery Specification, 2012

### 1. Reference Documents

GeoTIFF Specification, version 1.8.2, found on the web at <http://www.remotesensing.org/geotiff/spec/geotiffhome.html>

### 2. Requirements

#### 2.1 Characteristics

##### 2.1.1 Image Format

Images shall be delivered in GeoTIFF format. Individual GeoTIFF images shall form a mosaic that covers the areas of interest. The file format shall conform to the GeoTIFF Specification, version 1.8.2 at <http://www.remotesensing.org/geotiff/spec/geotiffhome.html> . Proprietary tags shall not be used. Image size shall be 5000 x 5000. Projection information in .XML format should accompany each ortho-image.

The No Data value shall be specified in the metadata and shall not occur within the image data. A No Data value of (0,0,0) shall be used. No Data areas shall only occur outside the boundary of the specified Area of Interest (AOI).

All ortho-imagery shall be delivered on individual external hard drives by Area of Interest to the State of Michigan, CSSTP.

Image files from each AOI shall be labeled with names that end in five digit numbers. The number fields at the end of the filenames within an AOI shall all be consecutive without omission or duplication and shall begin with "00001". The text preceding the image number within the image filename shall be of the form

(area of interest code)\_(contractor code)\_YYYYMMDD

where YYYY is the year, MM is the two digit month, and DD is the two digit day of acquisition.

##### 2.1.2 Image Type

Image tiles shall be 4-band image files comprised of the three visible bands and the near-infrared band. Band order to be as follows:

- Band 1: Red
- Band 2: Green
- Band3: Blue
- Band4: Near-Infrared

Image radiometric resolution should be set to 8 bits per channel to create 32-bit image files. All bands should be balanced such that natural-color (Red, Green, Blue) and standard false-color composites



(Infrared, Red, Green) are spectrally correct. Natural color composites should appear natural to a human observer.

### 2.1.3 Image Coordinates

All ortho-imagery and derivative data, such as tile footprints and flight line files, shall be referenced to the following coordinate space:

**Coordinate System:** Michigan State Plane, appropriate zone

**Datum:** North American Datum 1983(1986)

**Units:** International Feet

Care must be taken such that the datum is actually NAD1983(1986) rather than another realization of NAD1983, such as NAD1983(CORS96) or NAD1983(HARN). As of September 2012, GPS data collected in Michigan using real-time correction data from the Continuously Operating Reference Network (CORS) will be referenced to NAD1983(CORS96). It is important that the vendor transform any data to the correct datum before image processing begins.

### 2.1.4 Image Scale

Data collection shall occur at 12 inch (0.30 meter) ground sample distance (GSD)  $\pm 10\%$ . This will be considered the standard product GSD. Optional data collection at 6 inch (0.15 meter) GSD and 3 inch (0.075 meter) GSD will also be available as an optional product per details in Section 6 of this document.

### 2.1.5 Metadata

Metadata shall be supplied for all images and shall include

- Image location and outline
- Accuracy statement giving the measured RMS 2D error and the corresponding error at the 95% confidence level, assuming a circular Gaussian error distribution
- 2D accuracy statement referencing the National Map Accuracy Standard for geospatial data at the 95% confidence level
- Camera used
- Date and time of acquisition
- Ground sample distance as collected
- Focal ratio and exposure time
- Remarks on image quality and artifacts, if any
- FGDC compliant metadata for the Area of Interest
- The name of the supervising Certified Photogrammetrist



## 2.2 Image Quality

**Certified Photogrammetrist:** All production shall be under the supervision of an American Society of Photogrammetry and Remote Sensing (ASPRS) Certified Photogrammetrist. All products shall be reviewed and approved by an ASPRS Certified Photogrammetrist. The name of the supervising Certified Photogrammetrist shall be included in the metadata.

### 2.2.1 General Image Quality

Images shall appear sharp when viewed at 1 pixel per GSD and displayed or printed on high quality equipment at 80 to 100 pixels per inch. Mosaicking artifacts and other image artifacts shall be minimal or completely unnoticeable. Color mosaics shall be free from clouds, cloud shadows, haze, prominent seams, gridding due to uncorrected camera vignetting, and other obvious, uncorrected artifacts. Hot spots and water glint shall be corrected.

### 2.2.2 Instrument Corrections

Instrument corrections for distortion and radiometric level shall be applied to raw data values based on most recent and up-to-date camera calibrations. Camera calibration records shall be maintained on file by the aerial photography company and copies of these records shall be provided.

### 2.2.3 Radiometric Correction

Images shall be color balanced to minimize perceptible differences in color tones within and between adjacent images. Color balancing shall result in colors which appear natural to a human observer.

Image contrast and brightness shall be adjusted to minimize perceptible differences within and between adjacent images.

Adjustment(s) as necessary shall be undertaken based on State of Michigan (SOM) review of each AOI.

### 2.2.4 Spatial Correction

The best available Digital Elevation Model (DEM) or Digital Terrain Model (DTM) representing the ground surface (e.g., Bare-earth) should be used to ortho-rectify the imagery. The elevation data may be obtained from the United States Geological Survey (USGS), or from another source, such as the State of Michigan or a partner. Elevation data may be derived from LiDAR, photogrammetry or aerial triangulation autocorrelation as long as it provides sufficient accuracy and precision to support ortho-imagery horizontal accuracy requirements.

Cultural features such as roads, bridges, overpasses, buildings and other important features that are impacted by DEM artifacts shall be repaired.

During ortho-rectification, images shall be re-sampled at the specified GSD.



### 2.2.5 Mosaicking

Prior to tiling, image seams shall be placed to minimize disruption of important features of cultural or geographic significance—for example, large buildings, bridges, and major rivers. Image seams shall not run through elevated structures, such as bridges, overpasses, and large buildings. When feasible, seams shall be placed at naturally occurring lines in the image to render them less noticeable. Skews greater than one pixel shall be corrected.

### 2.2.6 Accuracy

All ortho-imagery shall meet the horizontal accuracy requirement for 1:1,200 scale data, National Standard for Spatial Data Accuracy (NSSDA) at the 95% confidence level. The horizontal accuracy value is +/- 3.80 feet, or 1.159 meters. In other words, 95% of the positions in the dataset must have an error with respect to true ground position that is equal to or smaller than 3.80 feet.

To ensure the data meets the horizontal accuracy requirement, the vendor will calculate the horizontal root mean squared error (RMSE) by comparing transformed ortho-imagery coordinates with field-based ground control point and check point coordinate locations. The vendor will then calculate the horizontal accuracy at the 95% confidence level using the following equation.

$$\text{Accuracy}_r = \text{RMSE}_r * 1.7308$$

Where:

Accuracy<sub>r</sub> = Horizontal Accuracy at the 95% confidence level

RMSE<sub>r</sub> = Horizontal Root Mean Squared Error

To obtain this level of horizontal accuracy the vendor shall employ Airborne Global Positioning System (AGPS) and Inertial Measurement Unit (IMU) technologies to record the precise location (X,Y,Z) and attitude (roll, pitch, yaw) of the sensor during image capture.

The vendor must also collect additional field-based ground control points (GCPs) to supplement the airborne data such that minimum accuracy requirements are met. **At least 2** check points must also be located in each county or AOI, whichever is smallest in extent. In other words, if an AOI is composed of 5 counties, there must be 10 check points collected; 2 for each county. Check points may be located anywhere in the AOI but should not be in the same vicinity as the GCPs. Check points are not to be used in the Aerial Triangulation solution.

GCPs and check points must be accurate to +/- 0.10 meters in the horizontal (x,y) and +/- 0.20 meters in the vertical (z).

Existing ground control supplied by the State of Michigan, a partner or a commercial entity may be used if available, assuming it meets the minimum accuracy requirements. Some data supplied by the State of



Michigan may need to be marked by the vendor. For example, existing monuments may need to be marked prior to aerial acquisition but coordinates will be supplied.

All field-based ground control points and check points shall be taken at locations which are clearly identifiable on the aerial imagery.

## 2.3 Image Collection Constraints

### 2.3.1 Equipment

All Imagery from a single Area of Interest (AOI) shall be collected using a single digital aerial survey camera in good working order with up-to-date calibrations, an image stabilization system using an inertial measurement unit (IMU) and equipped with airborne GPS (AGPS).

Imagery shall be acquired using a large-format digital, metrically calibrated imaging sensor capable of simultaneous multi-spectral capture of red, green, blue and near IR bands.

The digital camera shall employ methods for preventing image smear related to forward motion if necessary. Frame-based cameras must utilize Time Delayed Integration (TDI), or an equivalent technology, to address image smear.

The camera lens and detector array shall be clean and free of excess dust or lint.

### 2.3.2 Flight Path

Imagery in all AOIs shall be collected on either north-south (which is preferred) or east-west lines whenever feasible, and all imagery in a single AOI shall be collected on parallel lines, unless flight path restrictions in the area make this impractical.

### 2.3.3 Camera Orientation

Imagery shall be collected at a crab angle of less than 5 degrees, which is measured between the camera's along-track image axis and the aircraft line of flight. The camera shall be nadir pointed within 2 degrees on average and shall not exceed 4 degrees off nadir at any time during image collection.

### 2.3.4 Image Overlap and Sidelap

Imagery of the AOIs shall be collected with  $\geq 60\%$  in-track overlap and  $\geq 30\%$  sidelap.

### 2.3.5 Camera Settings

Camera aperture and exposure time shall be adjusted for light conditions to achieve optimal image quality, consistent with the camera manufacturer's recommendations or automated settings, unless the camera operator has data which demonstrate that a different setting produces superior results under conditions at the time of collection.

## 2.4 Environmental Conditions

Imagery shall be collected under clear skies. The air shall be free of smoke, dust, and excessive haze.

Imagery shall be collected at sun elevation angles greater than 30 degrees. Adjacent flight lines shall be flown at sun elevation angles which differ by less than 15 degrees.



Roadways shall not be wet from recent precipitation.

The ground shall be free of snow cover and lakes free of ice. The ground shall not be obscured by fog.

Imagery shall be collected while deciduous trees are free of leaves, unless this requirement has been waived by the customer in writing for the specific AOI. The requirement for leaf-free collection may be waived by the customer, at the customer's option, in areas where this is not critical, such as open fields, pine forest, and urban areas, in order to allow collection of imagery after the leaf-off season is over with.

**3. Areas of Interest**

Areas of interest (AOIs) shall be identified by County boundary plus a designated buffer area. If an AOI includes an island within the Great Lakes, the island shall be flown and processed like any other land area. AOIs totaling the desired number of square miles shall be identified by the State and provided via an ESRI shapefile.

**4. Quality Assurance Provisions**

**4.1 General**

Independent quality checks shall be performed to certify the accuracy of the product and conformance to image quality specifications. Specific inspections shall be carried out at appropriate image scale and frequency to verify the Image Quality requirements.

**4.2 Visual Inspection for Specific Artifacts**

All Image Quality Requirements in Sections 2.2.1, 2.2.2, 2.2.3, 2.2.4, and 2.2.5 shall be inspected at a scale of 400 feet per inch or larger. Seam lines, glints, color balance, DEM artifacts, and bridges on roadways shall be addressed in this inspection, and artifacts noticeable at this scale shall be corrected. In urban areas, a scale of 200 feet per inch or larger shall be used for inspection.

**4.3 Customer QA/QC**

Successful vendor must have an existing, secure application website for use in project management, quality control and available for use in communicating project status. The website shall allow for viewing of incremental deliverable products for the purpose of performing QA/QC prior to final physical delivery. Imagery shall become available for viewing with the completion of the first AOI and a 2 week time period will be designated for each AOI to be available for review. Imagery made available for review must be fully processed and should already have passed the vendor quality control process. The application shall allow project stake-holders the ability to review ortho-imagery, identify and attribute items in-question for discussion with both the State’s Project Manager and the PM of the successful Geospatial Contractor.

**4.4 Warranty Against Image Defects**

Defects in imagery collection that are reported by the customer within 90 days shall be corrected by re-acquisition and re-processing. Defects in image processing reported by the customer within 12 months shall be corrected by re-processing.



## 5. Deliverables

### 5.1 Hard Drives

All GeoTIFF image tiles organized into one sub-directory per County and items identified in Section 7, Deliverables, delivered to SOM via external hard drive.

Each partner to receive an external hard drive with the GeoTIFF image tiles and Section 7 items for their AOI.

### 5.2 Delivery schedule

Collected imagery in each season shall be delivered to the customer within 4 months of the end of the applicable flying season.

## 6. Buy-up Options

### 6.1 High Resolution Areas (HRA)

In addition to 12 inch (0.30 meter) GSD imagery, the vendor shall provide separate pricing for data collection at a GSD of 6 inch (0.15 meters) and a GSD of 3 inch (0.075 meters). The State of Michigan or its partners may elect to collect portions of an AOI at 12 inch (0.30 meter) GSD and other portions within that AOI at either 6 inch (0.15 meter) GSD and/or 3 inch (0.075 meter) GSD.

Spatial resolution shall match GSD  $\pm 10\%$ .

If this option is chosen for an AOI the area will be imaged at 6 inch or 3 inch resolution, rather than 12 inch resolution.

HRAs in high density urban areas shall be collected with  $\geq 80\%$  in-track overlap and  $\geq 60\%$  sidelap. This results in reduced building lean in these areas.

SOM shall provide an ESRI shapefile defining HRA areas.

HRAs shall meet the same image quality requirements as 12 inch (0.30 meter) GSD AOIs

### 6.2 Updated DEM (100% of AOI)

The vendor will provide pricing for the purchase of the updated DEM resulting from the image processing.

If this option is chosen for an AOI, the updated DEM resulting from image feature correlation processing and any DEM editing performed will be supplied to the customer for the AOI. The DEM supplied will be the DEM used to produce the orthoimagery for the AOI.

### 6.3 Compressed Image Mosaics

The vendor will provide pricing for the creation of a compressed image mosaic for each acquired County. In addition, pricing shall be provided for the creation of individual compressed mosaics for each City and Political Township within a County. This is to be accomplished by “clipping” the County mosaic using a boundary shapefile to be provided by SOM. All compressed mosaics to be delivered in JP2 or similar agreed upon file format and named using the common name for the County, City, and Township.



## **7. Additional Deliverables at no cost to the SOM**

### **7.1 ESRI Shapefiles**

To be delivered in the same coordinate system as the ortho-imagery.

#### **7.1.1 Tile index**

A polygon shapefile of the image tile boundaries shall be provided in the appropriate coordinate system. Each polygon will have a name attribute that corresponds with the image name and the flight date of the image.

#### **7.1.2 Flight lines**

A shapefile of the flight lines shall be provided in the appropriate coordinate system. Flight lines shall be attributed with the flight date.

#### **7.1.3 Vector seam index**

A shapefile representing the vectors used during the image seaming process shall be provided with a flight date attribute.



**Attachment B: State of Michigan Lidar Specification, 2012**  
*Derived from the USGS Lidar Base Specification Version 1.0*

**1.0 Conversion Factors**

Altitude and Elevation, as used in this report, refers to the distance above the geoid, unless specifically referenced to the ellipsoid.

Height, as used in this report, refers to the height above ground.

<b>Multiply</b>	<b>By</b>	<b>To obtain</b>
Length		
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
meter (m)	1.094	yard (yd)
Area		
square meter (m <sup>2</sup> )	0.0002471	acre
square meter (m <sup>2</sup> )	10.76	square foot (ft <sup>2</sup> )
hectare (ha)	2.471	acre
hectare (ha)	0.003861	square mile (mi <sup>2</sup> ) = 640 acres = 1 section
square kilometer (km <sup>2</sup> )	247.1	acre
square kilometer (km <sup>2</sup> )	0.3861022	square mile (mi <sup>2</sup> )



## 2.0 Abbreviations and Acronyms

ASPRS	American Society for Photogrammetry and Remote Sensing
CLICK	Center for Lidar Information, Coordination, and Knowledge
CONUS	Conterminous United States
CORS	Continuously Operating Reference Stations
CVA	Consolidated Vertical Accuracy
DEM	Digital Elevation Model
DSM	Digital Surface Models
DTED	digital terrain elevation data
DTM	digital terrain model
EDNA	Elevation Derivatives for National Applications
EPSG	European Petroleum Survey Group
FGDC	Federal Geographic Data Committee
FOV	field of view
FVA	Fundamental Vertical Accuracy
GB	gigabyte
GPS	Global Positioning System
GSD	ground sample distance
H&H	hydraulic and hydrologic
IFSAR	Interferometric Synthetic Aperature Radar
lidar	light detection and ranging
IMU	Inertial Measurement Unit
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NDEP	National Digital Elevation Program
NEEA	National Enhanced Elevation Assessment
NED	National Elevation Dataset
NGP	National Geospatial Program
NGS	National Geodetic Survey
NIR	near infra-red
NIST	National Institute of Standards and Technology
NPS	Nominal Pulse Spacing
NSRS	National Spatial Reference System
NSSDA	National Standards for Spatial Data Accuracy
OCONUS	Outside the Conterminous United States
QA/QC	Quality Assurance/Quality Control
RMSE	Root Mean Square Error
SOM	State of Michigan
SVA	Supplemental Vertical Accuracy
TIN	Triangulated Irregular Network
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
XML	eXtensible Markup Language



## 3.0 Introductory Material

### 3.1 Purpose and Scope

The State of Michigan (SOM) intends to use this specification to acquire and procure light detection and ranging (lidar) data, and to create consistency across all SOM and partner funded lidar collections. Most of the information in this specification was extracted from the USGS Lidar Base Specification Version 1.0 (<http://pubs.usgs.gov/tm/11b4/TM11-B4.pdf>; Heidemann, Hans Karl, 2012, *Lidar base specification version 1.0, U.S. Geological Survey Techniques and Methods, book 11, chap. B4, 63 p.*). While changes have been made to various sections to improve the applicability for the SOM and its partners, the specification still meets USGS standards. Also, some sections have been purposely excluded but still apply to this specification. In addition to reviewing this document, vendors responding to Request for Proposals for SOM lidar data collection should reference the following sections in the USGS Lidar Base Specification Version 1.0:

- Glossary (for terminology)
- Appendix 4. Lidar Metadata Example
- Appendix 5. Lidar Metadata Template

It must be emphasized that this is a base specification, defining minimum parameters for acceptance of the acquired lidar data. It is expected that local conditions in any given project area, specialized applications for the data, or the preferences of cooperators, may mandate more stringent requirements. The SOM encourages the collection of more detailed, accurate, or value-added data. A list of common upgrades to the minimum requirements defined in this report is provided in appendix 1.

### 3.2 Applicability

These specifications and guidelines are applicable to lidar data and deliverables supported in whole or in part, with either financial or in-kind contributions, by the SOM and/or the USGS.

### 3.3 Warranty Against Data Defects

Defects in imagery collection that are reported by the customer within 90 days shall be corrected by re-acquisition and re-processing. Defects in image processing reported by the customer within 12 months shall be corrected by re-processing.

## 4.0 Collection

### 4.1 Multiple Discrete Returns



Data collection must be capable of at least three returns per pulse. Full waveform collection is acceptable and welcomed; however, waveform data are regarded as supplemental information. Deriving and delivering multiple discrete returns is required in all cases.

## 4.2 Intensity Values

Intensity values are required for each return. The values are to be recorded in the .las files in their native radiometric resolution.

## 4.3 Nominal Pulse Spacing (NPS)

A NPS of at least 2 points per square meter is required. Dependent on the local terrain and land cover conditions in the project area, a greater point density may be required on specific projects. Assessment of the NPS will be made against single swath, first-return only data, located within the geometrically usable center portion (typically 90 percent) of each swath, acceptable data voids excluded. NPS will be calculated as the square root of the average area per point. Average along-track and cross-track point spacing should be comparable (within 10 percent).

In general, the target NPS for a project should not be achieved through swath overlap or multiple passes. Such collection techniques may be permitted with prior approval.

## 4.4 Data Voids

Data voids within a single swath are not acceptable, except in the following circumstances:

- Where caused by water bodies,
- Where caused by areas of low near infra-red (NIR) reflectivity such as asphalt or composition roofing, or
- Where appropriately filled-in by another swath.

## 4.5 Spatial Distribution

The spatial distribution of geometrically usable points is expected to be uniform. Although it is understood that lidar instruments do not produce regularly gridded points, collections should be planned and executed to produce a first-return point cloud that approaches a regular lattice of points, rather than a collection of widely spaced high density profiles of the terrain. The uniformity of the point density throughout the dataset is important and will be assessed using the following steps:

- Generating a density grid from the data with cell sizes equal to the design NPS times 2, using a radius equal to the design NPS.
- Ensuring at least 90 percent of the cells in the grid contain at least one lidar point.
- The assessment is to be made against individual (single) swaths, using only the first-return points located within the geometrically usable center portion (typically 90 percent) of each swath.
- Excluding acceptable data voids previously identified in this specification.

Note: This requirement may be relaxed in areas of substantial relief where it is impractical to maintain a consistent and uniform distribution.

Note: The process described in this section relates only to the uniformity of the point distribution. It in no



way relates to, nor can it be used for the assessment of point density or NPS.

#### 4.6 Scan Angle

Scan angle will support horizontal and vertical accuracy within the requirements as specified in the next two sections. See Appendix 2 for additional information.

Note: This requirement primarily is applicable to oscillating mirror lidar systems. Other instrument technologies may be exempt from this requirement.

#### 4.7 Vertical Accuracy

Vertical accuracy of the lidar data will be assessed and reported in accordance with the guidelines developed by the National Digital Elevation Program (NDEP) and subsequently adopted by the American Society for Photogrammetry and Remote Sensing (ASPRS). Complete definitions for vertical accuracy assessments are in Section 1.5 of the NDEP Elevation Guidelines (NDEP, 2004). Additionally, accuracy will be reported according to Quality Level (QL) as described in the National Enhanced Elevation Assessment (NEEA) revised on 3/29/2012 (<http://www.dewberry.com/Consultants/GeospatialMapping/FinalReport-NationalEnhancedElevationAssessment>). See table 1.

The minimum vertical accuracy requirement for the **unclassified lidar point cloud**, using the NDEP/ASPRS methodology, is listed below:

- Fundamental Vertical Accuracy (FVA) ≤ 18.5 centimeters (cm) Accuracyz (ACCz), 95 percent (9.25 cm Root Mean Square Error (RMSE)). This equates to Quality Level 2 (QL 2) in table 1.

The minimum vertical accuracy requirements for the **derived DEM**, using the NDEP/ASPRS methodology are listed below:

- Fundamental Vertical Accuracy (FVA) ≤ 18.5 centimeters (cm) Accuracyz (ACCz), 95 percent (9.25 cm Root Mean Square Error (RMSE)). Again, this equates to Quality Level 2 (QL 2) in table 1.

Table 1. Quality Levels for LiDAR Horizontal Resolution and Vertical Accuracy					
Elevation Quality Levels (QL)	Source	Horizontal Resolution Terms		Vertical Accuracy Terms	
		Point Density	Nominal Pulse Spacing (NPS)	Vertical RMSEz	Equivalent Contour Accuracy
QL 1	LiDAR	8 pts/m <sup>2</sup>	0.35 m	9.25 cm	1-ft
QL 2	LiDAR	2 pts/m <sup>2</sup>	0.7 m	9.25 cm	1-ft
QL 3	LiDAR	1 – 0.25 pts/m <sup>2</sup>	1 – 2 m	≤18.5 cm	2-ft

- Consolidated Vertical Accuracy (CVA) ≤ 26.5cm, 95th percentile, and
- Supplemental Vertical Accuracy (SVA) ≤ 26.5 cm, 95th percentile. Point cloud data accuracy is to be tested against a Triangulated Irregular Network (TIN) constructed from lidar points in clear and open areas. A clear and open area can be characterized with respect to topographic and ground cover variation such that a minimum of 5 times the NPS exists with less than 1/3 of the RMSEz deviation from a low-slope plane. Slopes that exceed 10 percent should be



avoided. Ground that has been plowed or otherwise disturbed is not acceptable. All tested locations should be photographed showing the position of the tripod and the surrounding area ground condition.

- Each land cover type representing 10 percent or more of the total project area must be tested and reported with an SVA. In areas where a land cover category is something other than forested or dense urban, the tested point should not have any obstructions 45 degrees above the horizon to ensure a sufficient TIN surface. Additionally, tested areas should not be in proximity to low NIR reflective surfaces such as asphalt or composition roofing materials.

The SVA value is provided as a target. It is understood that in areas of dense vegetation, swamps, or extremely difficult terrain, this value may be exceeded.

The CVA value is a requirement that must be met, regardless of any allowed “busts” in the SVA(s) for individual land cover types within the project.

Checkpoints for each assessment (FVA, CVA, and all SVAs) are required to be well-distributed throughout the land cover type, for the entire project area. See Glossary for definition of well-distributed.

Exceptions: These requirements may be relaxed in cases:

- Where there exists a demonstrable and substantial increase in cost to obtain this accuracy.
- Where an alternate specification is needed to conform to previously contracted phases of a single larger overall collection effort, for example, multi-year statewide collections.
- Where the SOM agrees that it is reasonable and in the best interest of all stakeholders to use an alternate specification.

#### **4.8 Relative Accuracy**

The requirements for relative accuracy are listed below:

- Within individual swaths:  $\leq 7$  cm RMSEz
- Within overlap between adjacent swaths:  $\leq 10$  cm RMSEz

#### **4.9 Flightline Overlap**

Flightline overlap of 10 percent or greater is required to ensure there are no data gaps between the usable portions of the swaths. Collections in high relief terrain are expected to require greater overlap. Any data with gaps between the geometrically usable portions of the swaths will be rejected.

#### **4.10 Collection Area**

Data collection will cover the entire project area as defined by SOM. SOM will provide AOI boundaries in ESRI Shapefile format. All AOI shapefiles will include a buffer of at least 100 meters. Data delivered to the SOM will include all areas specified by the AOI shapefiles.

#### **4.11 Collection Conditions**

Atmospheric conditions must be cloud and fog-free between the aircraft and ground during all collection operations.



Ground conditions must be snow free. Very light, undrifted snow may be acceptable in special cases, with prior written approval from the SOM.

Water conditions must be free of any unusual flooding or inundation, except in cases where the goal of the collection is to map the inundation.

Leaf-off vegetation conditions are preferred. If project delays are caused by the SOM and resulting conditions are deemed acceptable to meet or exceed the specifications for anticipated ground point returns, the program (data collection) may be permitted to continue with prior approval from the SOM.

## 5.0 Data Processing and Handling

### 5.1 ASPRS LAS File Format

All processing should be carried out with the understanding that all point deliverables are required to be in fully compliant LAS format, v1.1 or v1.2. Deliverables in LAS v1.4 will be considered an upgrade. The version selected must be used for all LAS deliverables in the project. Data producers are encouraged to review the appropriate LAS specification in detail (ASPRS, 2011).

### 5.2 Full Waveform

If full waveform data are collected, delivery of the waveform packets is required in LAS v1.4. Deliverables with waveform data are to use external auxiliary files with the extension .wdp for the storage of waveform packet data. See the appropriate LAS Specification for additional information (ASPRS, 2011).

### 5.3 Global Positioning System (GPS) Times

GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each pulse. Adjusted GPS Time is defined to be Standard (or satellite) GPS time minus  $1 \times 10^9$ . See the appropriate LAS Specification for more detail (ASPRS, 2011).

### 5.4 Datums

All data collected must be tied to the datums listed below:

- **Horizontal Datum:** Most current realization of the North American Datum of 1983 (NAD83), including epoch, as determined by the National Geodetic Survey (NGS), and which existing Continuously Operating Reference Station (CORS) data is referenced. As of 10/1/2012 the horizontal datum to which CORS is referenced is NAD83(CORS96); epoch 2002.0. This is expected to change to NAD83(2011); epoch 2010.0 in late 2012 or early 2013.
- **Vertical Datum:** Data must be referenced to the North American Vertical Datum of 1988 (NAVD 88).



- **Geoid Model:** The most current National Geodetic Survey (NGS)-approved geoid model is required to perform conversions from ellipsoidal heights to orthometric heights. As of 10/1/2012 the most current Geoid Model as defined by the NGS is GEOID12A.

## 5.5 Coordinate Reference System

The SOM required Coordinate Reference System is as follows:

- Coordinate Reference System:** Michigan State Plane
- Horizontal Datum:** Most current realization of NAD83 (see 5.4 above)
- Horizontal Units:** International Feet
- Vertical Datum:** NAVD88
- Vertical Units:** International Feet
- Vertical Reference:** Orthometric Heights
- Geoid Model:** Most Current NGS Geoid model

Each discrete project is to be processed using the single predominant State Plane zone for the overall collection area (e.g., North, Central, South).

## 5.6 Units of Reference

All references to the unit of measure “Feet” and “Foot” must specify “International” or “Intl”, U.S. survey feet are not to be used as a unit of measure.

## 5.7 Swath Identification

Each swath will be assigned a unique File Source ID. It is required that the Point Source ID field for each point within each LAS swath file be set equal to the File Source ID before any processing of the data. Refer to the appropriate LAS Specification (ASPRS, 2011).

## 5.8 Point Families

Point families (multiple return “children” of a single “parent” pulse) shall be maintained intact through all processing before tiling. Multiple returns from a given pulse will be stored in sequential (collected) order.

## 5.9 Swath Size and Segmentation

Swath files will be 2 gigabytes (GB) in size or less. Long swaths (those which result in a LAS file larger than 2 GB) will be split into segments no greater than 2 GB each.

- Each sub-swath will retain the original File Source ID of the original complete swath.
- Points within each sub-swath will retain the Point Source ID of the original complete swath.
- Each sub-swath file will be named identically to the original complete swath, with the addition of an ordered alphabetic suffix to the name (“-a”, “-b” ... “-n”). The order of the named sub-swaths shall be consistent with the collection order of the points (“-a” will be the chronological beginning of the swath; “-n” will be the chronological end of the swath).
- Point families shall be maintained intact within each sub-swath.
- Sub-swaths should be broken at the edge of the scan line.



- Other swath segmentation approaches may be acceptable, with prior approval.

### 5.10 Scope of Collection

All collected swaths are to be delivered as part of the Calibrated Raw Data Deliverable. This includes calibration swaths and cross-ties. This in no way requires or implies that calibration swath data are to be included in product generation. All collected points are to be delivered. No points are to be deleted from the swath LAS files. Excepted from this are extraneous data outside of the buffered project area (aircraft turns, transit between the collection area and airport, transit between fill-in areas, and the like). These points may be permanently removed. Busted swaths that are being completely discarded by the vendor and re-flown do not need to be delivered.

### 5.11 Use of the LAS Withheld Flag

Outliers, blunders, noise points, geometrically unreliable points near the extreme edge of the swath, and other points the vendor deems unusable are to be identified using the Withheld flag, as defined in the LAS specification.

This applies primarily to points that are identified during pre-processing or through automated post-processing routines.

If processing software is not capable of populating the Withheld bit, these points may be identified using Class=11.

Noise points subsequently identified during manual Classification and Quality Assurance/Quality Control (QA/QC) may be assigned the standard LAS classification value for Noise (Class=7), regardless of whether the noise is “low” or “high” relative to the ground surface.

### 5.12 Point Classification

- ALL points not identified as Withheld are to be classified.
- No points in the Classified LAS deliverable will be assigned Class=0.
- Use of the ASPRS/LAS Overlap classification (Class=12) is prohibited.

If overlap points are required to be differentiated by the data producer or cooperating partner, they must be identified using a method that does not interfere with their classification:

- Overlap points are tagged using Bit:0 of the User Data byte, as defined in the LAS specification. (SET=Overlap).
- Overlap points are classified using the Standard Class values + 16.
- Other techniques as agreed upon in advance.

The technique used to identify overlap must be clearly described in the project metadata files. Note: A standard bit flag for identification of overlap points has been included in LAS v1.4, released on November 14, 2011. This is only relevant for full waveform data since it must be delivered in LAS v1.4.

### 5.13 Positional Accuracy Validation

Before classification of and development of derivative products from the point cloud, verification of the vertical accuracy of the point cloud, absolute and relative, is required. The Fundamental Vertical Accuracy



(absolute) is to be assessed in clear, open areas as described in the section called Vertical Accuracy above. Swath-to-swath and within swath accuracies (relative) are to be documented. A detailed report of this validation process is a required deliverable.

### 5.14 Classification Accuracy

It is required that due diligence in the classification process will produce data that meet the following tests:

- Following classification processing, no non-withheld points should remain in Class 0.
- Within any 1 kilometer (km) x 1 km area, no more than 2 percent of non-withheld points will possess a demonstrably erroneous classification value.

Note: These requirements may be relaxed to accommodate collections in areas where the SOM agrees classification to be particularly difficult.

### 5.15 Classification Consistency

Point classification is to be consistent across the entire project. Noticeable variations in the character, texture, or quality of the classification between tiles, swaths, lifts, or other non-natural divisions will be cause for rejection of the entire deliverable.

### 5.16 Tiles

Note: This section assumes a projected coordinate reference system.

A single non-overlapped tiling scheme (the Project Tiling Scheme) will be established and agreed upon by the data producer and the SOM before collection (file size will be a determinant). This scheme will be used for ALL tiled deliverables.

- Tile size is required to be an integer multiple of the cell size of raster deliverables.
- Tiles are required to be sized using the same units as the coordinate system of the data.
- Tiles are required to be indexed in X and Y to an integer multiple of the tile’s X-Y dimensions.
- All tiled deliverables will conform to the Project Tiling Scheme, without added overlap.
- Tiled deliverables will edge-match seamlessly and without gaps.

Note: SOM recommends a tiling scheme of 10,000 feet x 10,000 feet. This may be changed after discussions between SOM and the vendor.

## 6.0 Hydro-Flattening

Note: Please refer to appendix 3 for reference information on hydro-flattening.

Hydro-flattening pertains only to the creation of derived DEMs. Breaklines may be used to help classify the point data. The goal of the SOM, through use of hydro-flattening, is to enhance the cartographic and aesthetic



value of derived DEMs (and derived contours) concerning water features. The goal is not to produce either Hydro-conditioned or Hydro-enforced DEMs. To accomplish this goal will require that ponds and lakes (of the size specified) include shore breaklines and/or polygons possessing a single elevation representing the current water level. Inland rivers and streams (of the size specified) will be addressed through creation of breaklines on either shore, and contain a descending elevation in the direction of flow as required to accurately reflect the current elevation of the water surface.

### 6.1 Inland Ponds and Lakes

- 2 acres or greater surface area (approximately equal to a round pond 350 feet in diameter) at the time of collection.
- Flat and level water bodies (single elevation for every bank vertex defining a given water body).
- The entire water surface edge must be at or below the immediately surrounding terrain. The presence of floating water bodies will be cause for rejection of the deliverable.
- Long impoundments such as reservoirs or inlets, whose water surface elevations drop when moving downstream, are required to be treated as rivers.

Note: Feature size thresholds may be increased by the SOM if the current thresholds prove to be prohibitively expensive.

### 6.2 Inland Streams and Rivers

- 100 feet nominal width: This should not unnecessarily break a stream or river into multiple segments. At times it may squeeze slightly below 100 feet for short segments. Data producers should use their best professional cartographic judgment.
- Flat and level bank-to-bank (perpendicular to the apparent flow centerline); gradient to follow the immediately surrounding terrain. In cases of sharp turns of rapidly moving water, where the natural water surface is notably not level bank-to-bank, it is appropriate to represent the water surface as it exists in nature, while maintaining an aesthetic cartographic appearance.
- The entire water surface edge must be at or below the immediately surrounding terrain.
- Stream channels are required to break at road crossings (culvert locations). The roadway over a culvert should be continuous. A culvert, regardless of size, is defined as having earth between the road surface and the top of the structure.
- Bridges are required to be removed from the DEM. Streams and rivers should be continuous at bridge locations. Bridges are defined as having an elevated deck structure that does not rest on earth.
- When the identification of a structure such as a bridge or culvert cannot be made reliably, the feature should be regarded as a culvert.



### 6.3 Great Lakes

- Water surface is to be flat and level.
- The entire water surface edge must be at or below the immediately surrounding terrain.

### 6.4 Islands

- Permanent islands 1 acre or larger shall be delineated within all water bodies. This includes the Great Lakes.

### 6.5 Single-Line Streams

Cooperating partners may require collection and integration of single-line streams within their lidar projects. Although the SOM does not require these breaklines be collected or integrated, it does require that if used and incorporated into the DEMs, the following guidelines are met:

- All vertices along single-line stream breaklines are at or below the immediately surrounding terrain.
- Single-line stream breaklines are not to be used to introduce cuts into the DEM at road crossings (culverts), dams, or other such features. This is hydro-enforcement and as discussed in appendix 3 will create a non-topographic DEM.
- All breaklines used to modify the surface are to be delivered to the SOM with the DEMs.

## 7.0 Deliverables

### 7.1 Metadata

The term “metadata” refers to all descriptive information about the project. This includes textual reports, graphics, supporting shapefiles, and Federal Geographic Data Committee (FGDC)-compliant metadata files. Metadata deliverables include the following items:

- Collection report detailing mission planning and flight logs.
- Survey report detailing the collection of control and reference points used for calibration and QA/QC.
- Processing report detailing calibration, classification, and product generation procedures including methodology used for breakline collection and hydro-flattening if hydro-flattening is requested (see the section called Hydro-Flattening and appendix 3 for more information on hydro-flattening).
- QA/QC Reports (detailing the analysis, accuracy assessment and validation of the following:
  - Point data (absolute, within swath, and between swath)
  - Bare-earth surface (absolute)
  - Other optional deliverables as appropriate
- Control and calibration points: All control and reference points used to calibrate, control, process, and



validate the lidar point data or any derivative products that are to be delivered in report form including appropriate from/to diagrams and photographs.

- Georeferenced, digital spatial representation of the precise extents of each delivered dataset. This should reflect the extents of the actual lidar source or derived product data, exclusive of TIN artifacts or raster NODATA areas. A union of tile boundaries or minimum bounding rectangles is not acceptable. ESRI Polygon shapefile or geodatabase is preferred.
- Product metadata [FGDC compliant, eXtensible Markup Language (XML) format metadata]. Each Lift: Describing the extents of the lift, the swaths included in the lift, locations of GPS base stations and control for the lift, preprocessing and calibration details for the lift, adjustment and fitting processes applied to the lift in relation to other lifts, and other lift-specific information.
- Each tiled deliverable product group:
  - Raw point data (calibrated-unclassified)
  - Classified point data
  - Bare-earth DEMs
  - Breaklines (if generated)
  - Other datasets delivered under the contract (Hydro-flattened and/or Hydro-enforced DEM, intensity images, and others)
  - FGDC compliant metadata must pass the FGDC metadata parser (mp) with no errors.

**Note:** Please refer to the metadata templates in appendixes 4 and 5 of the USGS Lidar Base Specification Version 1.0 for additional information.

## 7.2 Raw Point Cloud

Delivery of the raw point cloud, otherwise known as the **Calibrated-unclassified point cloud**, is a standard requirement for SOM lidar projects. Raw point cloud deliverables include the following items:

- All swaths, returns, and collected points, fully calibrated and adjusted to ground, by swath.
  - Withheld points should not be included in this deliverable but are required in the Classified Point Cloud.
- Fully compliant LAS v1.1 or v1.2 (or v1.4 if full waveform data), Point Data Record Format must conform to delivered LAS version.
- If provided as an upgrade to v1.1/v1.2, LAS v1.4 deliverables with waveform data are to use external auxiliary files with the extension .wdp for the storage of waveform packet data. See appropriate LAS Specification for additional information (ASPRS 2011).
- Correct and properly formatted georeference information must be included in all LAS file headers.
- GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each pulse.
- Intensity values (native radiometric resolution).
- One file per swath, one swath per file, file size not to exceed 2 GB, as described under the section called Swath Size and Segmentation above.



- Vertical accuracy requirements using the NDEP/ASPRS methodology for the point cloud are FVA<= 18.5 cm ACCz, 95-percent confidence level (9.25 cm RMSEz).

### 7.3 Classified Point Cloud

Delivery of classified point cloud data is a standard requirement for SOM lidar projects. Specific scientific research projects may be exempt from this requirement. Classified point cloud deliverables include the following items:

- All project swaths, returns, and collected points, fully calibrated, adjusted to ground, and classified, by tiles. Project swaths exclude calibration swaths, cross-ties, and other swaths not used, or intended to be used, in product generation.
- Fully compliant LAS v1.1 or v1.2 (or v1.4 if full waveform data), Point Data Record Format must conform to delivered LAS version.
- If provided as an upgrade to v1.1/v1.2, LAS v1.4 deliverables with waveform data are to use external auxiliary files with the extension .wdp for the storage of waveform packet data. See appropriate LAS Specification for additional information (ASPRS 2011).
- Correct and properly formatted georeference information must be included in all LAS file headers.
- GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each pulse.
- Intensity values (native radiometric resolution).
- Tiled delivery, without overlap, using Project Tiling Scheme.
- Classification Scheme (minimum) as listed in table 2.
- Vertical accuracy requirements using the NDEP/ASPRS methodology for the point cloud are FVA<= 18.5 cm ACCz, 95-percent confidence level (9.25 cm RMSEz).

**Table 2. Minimum Classified Point Cloud Classification Scheme**

Code	Description
1	Not ground (all returns deemed not ground returns)
2	Bare-earth ground (DEM)
7*	Noise(low or high; manually identified if needed)
9	Water (if Hydro-flattened or Hydro-enforced DEM requested)
10**	Ignored Ground (if Hydro-flattened or Hydro-enforced DEM requested; Breakline proximity)
11	Withheld (if the Withheld bit is not implemented in processing software)
*Class 7, Noise, is included as an adjunct to the Withheld bit. All noise points are to be identified using one of these two methods.	
**Class 10, Ignored Ground, is for points previously classified as bare-earth but whose proximity to a subsequently added breakline requires that it be excluded during Digital Elevation Model (DEM) generation.	

### 7.4 Bare-Earth Surface Digital Elevation Model (DEM)

Delivery of a bare-earth DEM in both Raster and ASCII format is required. Bare-earth surface deliverables



include the following items:

- Bare-earth DEM, generated through use of a triangulated irregular network (TIN), to the limits of the Buffered Project Area.
  - Raster data file with cell size no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).
    - Delivery in an industry-standard, GIS-compatible, 32-bit floating point raster format (ERDAS .IMG preferred).
  - ASCII text file with grid spacing no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).
- Georeference information shall be included in each raster and ASCII file.
- Tiled delivery, without overlap.
- DEM tiles will show no edge artifacts or mismatch. A quilted appearance in the overall project DEM surface, whether caused by differences in processing quality or character between tiles, swaths, lifts, or other non-natural divisions, will be cause for rejection of the entire deliverable.
- Void areas (for example, areas outside the Buffered Project Area but within the tiling scheme) shall be coded using a unique NODATA value. This value shall be identified in the appropriate location within the raster file header or external support files (for example, .aux).
- Vertical accuracy of the bare-earth surface will be assessed and reported in accordance with the guidelines developed by the NDEP and subsequently adopted by the ASPRS. The complete guidelines are in Section 1.5 of the NDEP Guidelines (NDEP, 2004).
- The following thresholds represent the minimum vertical accuracy requirements using the NDEP/ASPRS methodology:
  - FVA<= 18.5 cm ACCz, 95 percent Confidence Level (9.25 cm RMSEz)
  - CVA<= 26.5 cm, 95th percentile
  - SVA<= 26.5 cm, 95th percentile
- All QA/QC analysis materials and results are to be delivered to the SOM.
- Depressions (sinks), natural or man-made, are not to be filled (as in hydro-conditioning and hydro-enforcement).

## **7.5 Data Upgrade: Hydro-flattened Digital Elevation Model (DEM) and Breaklines/Polygons**

Delivery of a Hydro-flattened DEM in both Raster and ASCII format is required. Hydro-flattened surface deliverables include the following items:

- Hydro-flattened DEM, generated to the limits of the Buffered Project Area.
  - Raster data file with cell size no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).



- Delivery in an industry-standard, GIS-compatible, 32-bit floating point raster format (ERDAS .IMG preferred).
      - ASCII text file with grid spacing no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).
- Georeference information shall be included in each raster and ASCII file.
- Tiled delivery, without overlap.
- DEM tiles will show no edge artifacts or mismatch. A quilted appearance in the overall project DEM surface, whether caused by differences in processing quality or character between tiles, swaths, lifts, or other non-natural divisions, will be cause for rejection of the entire deliverable.
- Void areas (for example, areas outside the Buffered Project Area but within the tiling scheme) shall be coded using a unique NODATA value. This value shall be identified in the appropriate location within the raster file header or external support files (for example, .aux).
- Vertical accuracy of the DEM must match the vertical accuracy of the point data.
- Depressions (sinks), natural or man-made, are not to be filled (as in hydro-conditioning and hydro-enforcement).
- Water bodies (ponds and lakes), wide streams and rivers (double-line), and other non-tidal water bodies as defined in the section called Hydro-flattening are to be hydro-flattened within the DEM. Hydro-flattening shall be applied to all water impoundments, natural or man-made, that are larger than 2 acres in area (approximately equal to a round pond 350 feet in diameter), to all streams that are nominally wider than 100 feet, and to all Great Lakes areas. The methodology used for hydro-flattening is at the discretion of the data producer.

Note: Please refer to the section called Hydro-Flattening and appendix 3 for detailed discussions of hydro-flattening.

Delivery of the breaklines generated during hydro-flattening is a standard requirement for SOM lidar projects if Hydro-flattening was completed. If hydro-flattening is achieved through other means, this section may not apply. Breakline (and/or polygon) deliverables include the following items:

- Breaklines defining the limits and elevations of the water bodies shall be developed to the limit of the Buffered Project Area.
- All breaklines developed for use in hydro-flattening shall be delivered as an ESRI feature class (PolylineZ or PolygonZ format, as appropriate to the type of feature represented and the methodology used by the data producer). Shapefile or geodatabase is required.
- Each feature class or shapefile will include properly formatted and accurate georeference information in the standard location. All shapefiles must include a correct and properly formatted \*.prj file.
- Breaklines must use the same coordinate reference system (horizontal and vertical) and units as the lidar point delivery.
- Breakline delivery may be as a continuous layer or in tiles, at the discretion of the data producer. In the case of tiled deliveries, all features must edge-match exactly across tile boundaries in both the horizontal



(X-Y) and vertical (Z) spatial locations.

If Hydro-flattening is selected as an upgrade, the Classified Point Cloud Data (7.3) must include Water points.

## 7.6 Data Upgrade: Hydro-Enforced Digital Elevation Model (DEM) and Breaklines/Polygons

Delivery of a Hydro-enforced DEM in both Raster and ASCII format is required. Deliverables include the following items:

- Hydro-enforced DEM, generated to the limits of the Buffered Project Area.
  - Raster data file with cell size no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).
    - Delivery in an industry-standard, GIS-compatible, 32-bit floating point raster format (ERDAS .IMG preferred).
  - ASCII text file with grid spacing no greater than 3 feet, and no less than the design Nominal Pulse Spacing (NPS).
- Georeference information shall be included in each raster and ASCII file.
- Tiled delivery, without overlap.
- Hydro-enforced DEM tiles will show no edge artifacts or mismatch. A quilted appearance in the overall project DEM surface, whether caused by differences in processing quality or character between tiles, swaths, lifts, or other non-natural divisions, will be cause for rejection of the entire deliverable.
- Void areas (for example, areas outside the Buffered Project Area but within the tiling scheme) shall be coded using a unique NODATA value. This value shall be identified in the appropriate location within the raster file header or external support files (for example, .aux).
- Vertical accuracy of the DEM must match the vertical accuracy of the point data.

Note: Reference Appendix 3 for Hydrologically-Enforced definition, and requirements.

Delivery of the breaklines generated during hydro-enforcement is a standard requirement for SOM lidar projects if Hydro-enforcement was completed. Breakline (and/or polygon) deliverables include the following items:

- Breaklines defining the limits and elevation of water bodies shall be developed to the limit of the Buffered Project Area.
- All breaklines developed for use in hydro-enforcement shall be delivered as an ESRI feature class (PolylineZ or PolygonZ format, as appropriate to the type of feature represented and the methodology used by the data producer). Shapefile or geodatabase is required.
- Each feature class or shapefile will include properly formatted and accurate georeference information in the standard location. All shapefiles must include a correct and properly formatted \*.prj file.
- Breaklines must use the same coordinate reference system (horizontal and vertical) and units as the lidar point delivery. Breakline delivery may be as a continuous layer by Area of Interest or in tiles, at the discretion of the data producer. In the case of tiled deliveries, all features must edge-match exactly across



tile boundaries in both the horizontal (X-Y) and vertical (Z) spatial locations.

If Hydro-enforcement is selected as an upgrade, the Classified Point Cloud Data (7.3) must include Water points.

## 7.7 Data Upgrade: Lidar Intensity Images

Lidar intensity images are georeferenced raster files with each pixel representing the intensity of the Lidar return.

- Lidar intensity image, generated to the limits of the Buffered Project Area.
  - Raster data file with cell size no greater than 3 feet.
    - 8-bit GeoTIFF file format required.
- Georeference information shall be included in each raster file.
- Tiled delivery, without overlap.
- Void areas (for example, areas outside the Buffered Project Area but within the tiling scheme) shall be coded using a NODATA value.

## References Cited

American Society for Photogrammetry & Remote Sensing (ASPRS), 2011, LAS specification (Version 1.4–R12): Bethesda, Md., ASPRS, 27 p. Available online at <http://www.asprs.org/Committee-General/LASer-LAS-File-Format-ExchangeActivities.html>.

American Society for Photogrammetry & Remote Sensing (ASPRS), 2004. Vertical accuracy reporting for lidar—Version 1.0, 20 p. (Also available at [http://www.asprs.org/a/society/committees/lidar/Downloads/Vertical\\_Accuracy\\_Reporting\\_for\\_Lidar\\_Data.pdf](http://www.asprs.org/a/society/committees/lidar/Downloads/Vertical_Accuracy_Reporting_for_Lidar_Data.pdf).)

Gesch, D.B., 2007, The National Elevation Dataset, chap. 4 of Maune, D., ed., Digital elevation model technologies and applications—the DEM user’s manual, (2nd ed.): Bethesda, Md., American Society for Photogrammetry and Remote Sensing, p. 99–118. (Also available at [http://topotools.cr.USGS.gov/pdfs/Gesch\\_Chp\\_4\\_Nat\\_Elev\\_Data\\_2007.pdf](http://topotools.cr.USGS.gov/pdfs/Gesch_Chp_4_Nat_Elev_Data_2007.pdf).)

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National Digital Elevation Program (NDEP), 2004, Guidelines for Digital Elevation Data—Version 1: 93 p. (Also available at [http://www.ndep.gov/NDEP\\_Elevation\\_Guidelines\\_Ver1\\_10May2004.pdf](http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf).)

Stoker, J.M., Greenlee, S.K., Gesch, D.B., and Menig, J.C., 2006, CLICK—the new USGS center for lidar information coordination and knowledge: Photogrammetric Engineering and Remote Sensing, v. 72, no. 6, p. 613–616. (Also available at <http://www.asprs.org/a/publications/pers/2006journal/june/highlight.pdf>.)

USGS Federal Geographic Data Committee, 1998, Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy, 20 p. (Also available at <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>.)



## Appendix 1. Common Data Upgrades

- Independent 3rd-Party QA/QC by another Architecture & Engineering (AE) Contractor (encouraged)
- Lower NPS (greater point density)
- Increased Vertical Accuracy
- Full Waveform collection and delivery
- Additional Environmental Constraints
  - Interpolation based on 1st>Returns
  - Interpolation based on All>Returns, summed
- Detailed Classification (additional classes; e.g., vegetation levels)
- Hydro-Enforced DEMs as an additional deliverable
- Hydro-Conditioned DEMs as an additional deliverable
- Breaklines (PolylineZ and PolygonZ) for single-line hydrographic features
  - Narrow streams not collected as double-line, culverts, and other similar features, including appropriate integration into delivered DEMs
  - Breaklines (PolylineZ and PolygonZ) for other features (to be determined)
  - Including appropriate integration into delivered DEMs
  - Extracted Buildings (PolygonZ)
- Footprints with maximum elevation or height above ground as an attribute
- Other products as defined by requirements and agreed upon in advance of funding commitment



## Appendix 2. Guidelines

### Scan Angle

For oscillating mirror lidar systems, the total field of view should not exceed 40 degrees (within 20 degrees of nadir). State of Michigan (SOM) quality assurance on collections performed using scan angles wider than 34 degrees will be particularly rigorous in the edge-of-swath areas. Lidar systems that use rotating mirrors/prisms may be exempted from this guideline.

### Swath Size

The processing report shall include detailed information on swath segmentation sufficient to allow reconstruction of the original swaths if needed.

### Non-Tidal Boundary Waters

The elevation along the edge or edges should behave consistently throughout the project. May be a single elevation (for example, a lake) or gradient (for example, a river), as appropriate. If unusual changes in water surface elevation occur during the course of the collection, then the surface may be treated as a tidal boundary, as described in the next section. The reason for the changes must be documented in the project metadata.

### Breaklines and Hydro-Flattening

The SOM does not require any particular process or methodology be used for hydro-flattening or for breakline collection, extraction, or integration. However, if breaklines are developed, the following general guidelines must be adhered to:

- Bare-earth lidar points that are in close proximity breaklines should be excluded from the DEM generation process. This is analogous to the removal of masspoints for the same reason in a traditional photogrammetrically compiled digital terrain model (DTM). The proximity threshold for reclassification as Ignored Ground is at the discretion of the data producer, but in general should not exceed the nominal pulse spacing (NPS). These points are to be retained in the delivered lidar point dataset and shall be reclassified as Ignored Ground (class value = 10) so that they may be subsequently identified.
- Delivered data must be sufficient for the SOM to effectively recreate the delivered DEMs using the lidar points and breaklines without substantial editing.
- The goal of hydro-flattening is to produce a topographic DEM that, with respect to water surfaces, resembles a DEM derived from traditional photogrammetric methods. Best professional judgment should be used to achieve this end.



## Appendix 3. Hydro-Flattening Reference

The subject of modifications to lidar-based digital elevation models (DEM) is somewhat new and there is substantial variation in the understanding of the topic across the industry.

The information presented here is not meant to supplant other reference materials and it should not be considered authoritative beyond its intended scope.

Hydro-flattening is a new term, first coined in the USGS Lidar Base Specification Version 1.0. It conveys the need of users to have a specific type of functional surface. Hydro-flattening of DEMs is accomplished predominantly through the use of breaklines, and this method is considered standard. Although other techniques may exist to achieve similar results, this section assumes the use of breaklines. The SOM does not require the use of any specific technique.

The Digital Elevation Model Technologies and Applications: The DEM User's Manual, 2nd Edition (Maune, 2007) provides the following definitions related to the adjustment of DEM surfaces for hydrologic analyses.

- *Hydrologically Conditioned (Hydro-Conditioned)* Processing of a DEM or TIN so that the flow of water is continuous across the entire terrain surface, including the removal of all spurious sinks or pits. The only sinks that are retained are the real ones on the landscape. Whereas hydrologically-enforced is relevant to drainage features that are generally mapped, hydrologically-conditioned is relevant to the entire land surface and is done so that water flow is continuous across the surface, whether that flow is in a stream channel or not. The purpose for continuous flow is so that relations/links among basins/catchments can be known for large areas. This term is specifically used when describing Elevation Derivatives for National Applications (EDNA), the dataset of NED derivatives made specifically for hydrologic modeling purposes.
- *Hydrologically-Enforced (Hydro-Enforced)* Processing of mapped water bodies so that lakes and reservoirs are level and so that streams flow downhill. For example, a DEM, TIN or topographic contour dataset with elevations removed from the tops of selected drainage structures (bridges and culverts) so as to depict the terrain under those structures. Hydro-enforcement enables hydrologic and hydraulic models to depict water flowing under these structures, rather than appearing in the computer model to be dammed by them because of road deck elevations higher than the water levels. Hydro-enforced TINs also use breaklines along shorelines and stream centerlines, for example, where these breaklines form the edges of TIN triangles along the alignment of drainage features. Shore breaklines for streams would be 3-D breaklines with elevations that decrease as the stream flows downstream; however, shore breaklines for lakes or reservoirs would have the same elevation for the entire shoreline if the water surface is known or assumed to be level throughout. See also the definition for hydrologically conditioned that has a slightly different meaning.

Whereas these are important and useful modifications, they result in surfaces that differ substantially from a traditional DEM. A hydro-conditioned surface has had its sinks filled and may have had its water-bodies flattened. This is necessary for correct flow modeling within and across large drainage basins. Hydro-enforcement extends this conditioning by requiring water bodies be leveled and streams flattened with the appropriate downhill gradient, and also by cutting through road crossings over streams (culvert locations) to allow a continuous flow path for water within the drainage. These treatments result in a surface on which water behaves as it physically does in the real world, and they are invaluable for specific types of hydraulic and hydrologic (H&H) modeling activities. Neither of these treatments is typical of a traditional DEM surface.

A traditional DEM, on the other hand, attempts to represent the ground surface more the way a bird, or person in an airplane, sees it. On this surface, natural depressions exist, and roadways create apparent sinks because the roadway is depicted continuously without regard to the culvert beneath, making it an apparent dam. Bridges, it should be noted, are removed in most all types of DEMs because they are man-made, above-ground structures that have been added to the landscape.

Note: DEMs developed solely for orthophoto production may include bridges, as their presence can prevent the smearing of structures and reduce the amount of post-production correction of the final orthophoto. These are special use DEMs and are not relevant to this discussion.



For years, raster DEMs have been created from a digital terrain model (DTM) of masspoints and breaklines, which in turn were created through photogrammetric compilation from stereo imagery. Photogrammetric DTMs inherently contain breaklines defining the edges of water bodies, coastlines, single-line streams, and double-line streams and rivers, as well as numerous other surface features.

Lidar technology, however, does not inherently collect the breaklines necessary to produce traditional DEMs. Breaklines have to be developed separately through a variety of techniques, and either used with the lidar points in the generation of the DEM, or applied as a correction to DEMs generated without breaklines.

## Supplemental Information

USGS Lidar Base Specification Version 1.0:

<http://pubs.usgs.gov/tm/11b4/TM11-B4.pdf>

Final Report; National Enhanced Elevation Assessment:

<http://www.dewberry.com/Consultants/GeospatialMapping/FinalReport-NationalEnhancedElevationAssessment>

USGS National Elevation Dataset (NED) Web site:

<http://ned.usgs.gov/>

National Digital Elevation Program Guidelines for Digital Elevation Data

[http://www.ndep.gov/NDEP\\_Elevation\\_Guidelines\\_Ver1\\_10May2004.pdf](http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf)

ASPRS LAS Specification

<http://asprs.org/Committee-General/LASer-LAS-File-Format-Exchange-Activities.html>

USGS Center for Lidar Information Coordination and Knowledge (CLICK) Web site:

<http://lidar.cr.usgs.gov/>

MP-Metadata Parser:

<http://geology.usgs.gov/tools/metadata/>

National Institute of Standards and Technology (NIST) Percentile Information:

<http://itl.nist.gov/div898/handbook/prc/section2/prc252.htm>



## Attachment C: Data as a Service Specifications

### 1. Requirements

#### 1.1 Characteristics

Provide a hosting and service solution capable of storing all SOM imagery and raster datasets (data). Solution to provide both hosting and service capabilities.

#### 1.2 Accessibility

Data must be stored in a secure environment such that it is only available to SOM employees, SOM internet mapping applications and SOM approved vendors.

Solution must provide data access via standard Services (WMS, WFS, WCS, etc.).

#### 1.3 SOM Administrative Access

Solution must provide secure administrative access to approved SOM users to accomplish the following administrative functions:

- Grant user access permissions
- Upload data to the host

#### 1.4 System Availability – option #1

Solution must provide services and accessibility that are available 365/24/7 with 98% availability.

Scheduled downtime for system maintenance not included.

Solution must accommodate a Recovery Time Objective (RTO) of 12 hours. RTO is the maximum amount of time that can elapse until the system is returned to service.

Solution must accommodate a Recovery Point Objective (RPO) of 12 hours. RPO is the maximum amount of data loss a business function can sustain during an event.

##### 1.4.1 System Availability – option #2

Solution must provide services and accessibility that are available 365/24/7 with 99.99% availability.

Scheduled downtime for system maintenance not included.

Solution must accommodate a Recovery Time Objective (RTO) of 2 hours.

Solution must accommodate a Recovery Point Objective (RPO) of 2 hours.

#### 1.5 System Pricing

Pricing represented as dollars per Gigabyte stored per month, inclusive of all downloads, uploads, and transmissions of Data.



**Attachment D - Reserved**



## Attachment F Enterprise Architecture Solution Assessment

### Contact Info & Purpose (vendor version)

**Instructions to Contractor:**

1. This attachment is included as reference for purposes of the Contract. It is not necessary to fill out this attachment for your proposal.
2. Under the awarded Contract, and as part of the option for Data as a Service, Contractor will be required to fill out and complete this attachment as part of the deliverables specified in Article 1.104 Section C – Data As A Service, Hosting Implementation And Operations Services.

The purpose of the EA Solution Assessment is to document architectural details of proposed IT solutions in order to determine compatibility with the overall SOM architecture. MDIT/SOM activities which require an Assessment include: the purchase of new licenses, contracting for software development services, purchase of new software components, installation of new software components, the purchase of new hardware components or the use of MDIT staff resources on any project beyond the design phase. All vendor proposals and new contracts must be accompanied by an Assessment, documenting the architectural details of the proposed solution. Vendor should complete all areas except where indicated.

#### Vendor Version 2.3

<b>Solution/Project Name</b>	<SOM complete by SOM prior to inclusion in Contract>
<b>Name/Number</b>	<SOM complete>
<b>Date Submitted</b>	<SOM complete>
<b>Vendor Name</b>	<vendor complete>
<b>Vendor City and State</b>	<vendor complete>
<b>Vendor Phone No.</b>	<vendor complete>
<b>Vendor eMail</b>	<vendor complete>
<b>A brief description of the proposed solution and business purpose/process.</b> <i>(please keep the description brief)</i>	<SOM complete>



***Additional description of  
the solution and business  
purpose.***

*(please expand the row as much  
as needed)*

*<vendor complete>*



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (vendor version)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>1</b>	<b>Server/Application Hosting</b>	<b>Comments</b>
	Internally Hosted	
	Externally Hosted	
	Internally & Externally Hosted	
<b>2</b>	<b>User Interface Type</b>	<b>Comments (e.g. version or release)</b>
	Browser	
	Citrix	
	Client	
	Mobile Browser	
	Mobile Client	
	Terminal	
	Other (explain =>)	
<b>3</b>	<b>Supported Browsers (internet)</b>	<b>Comments</b>
	IE 6.0+ (internet, intranet)	
	Firefox 3.0.x (internet)	
	Chrome 3.0 (internet)	
	Safari 4.x (internet)	
	Other (explain =>)	
<b>4</b>	<b>Data Exchange Interface</b>	<b>Comments (e.g. version or release)</b>
	EDI (industry protocol)	
	Flat File (private protocol)	
	Web Service	
	XML	
	Other (explain =>)	
<b>5</b>	<b>System Access</b>	<b>Comments</b>
	Internal (SOM only)	
	External (general public)	
	External (authorized)	
	Mixed (internal-external)	
<b>6</b>	<b>User Access</b>	<b>Comments</b>
	Internet	
	Intranet	
	Local Government (LGNet)	
	Public facing internet	
	Kiosk terminal	
	Vendor Net	
	VPN	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>7</b>	<b>Data Classification</b>	<b>Comments</b>
	Non-sensitive	
	Sensitive w/ personal ID info	
	Sensitive w/ no personal ID info	
	Not classified	
	Other (explain =>)	
<b>8</b>	<b>PCI-DSS Compliance Needed?</b>	<b>Comments</b>
	Yes	
	No	
<b>9</b>	<b>Data Audit Trail Implementation</b>	<b>Comments</b>
	Application Code	
	Database Audit Files	
	Database Triggers	
	Stored Procedures	
	Other (explain =>)	
<b>10</b>	<b>IT Services (Centers of Excellence)</b>	<b>Comments</b>
	x86 Virtualization	
	Address Verification	
	Business Objects Reporting	
	Digital Electronic Gateway (DEG)	
	Extract Transform Load (ETL)	
	Citrix Virtualization	
<b>11</b>	<b>Enterprise Data Storage</b>	<b>Comments</b>
	<10GB (small)	
	10GB-500GB (medium)	
	500GB - 4TB (large)	
	>4TB (x-large)	
<b>12</b>	<b>Database (RDBMS)</b>	<b>Comments</b>
	MS SQL Server 2008	
	MySQL 5.1	
	Oracle 11g	
	TeraData TD 13.0	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>13</b>	<b>Database Modeling Tools</b>	<b>Comments</b>
	Erwin 7.x, 8x	
	MSSQL Server Mgmt Studio (match db)	
	MySQL Workbench (match db)	
	Oracle Designer (match db)	
	TeraData Utilities (match db)	
	Other (explain =>)	
<b>14</b>	<b>Development Framework</b>	<b>Comments</b>
	.NET Framework 3.5, 4.0	
	Java J2EE 5.x, 6x	
	Other (explain =>)	
<b>15</b>	<b>Development Platform</b>	<b>Comments</b>
	Eclipse 3.x, 4.x	
	Hibernate 3.x	
	IBM Websphere Integration Dev 6.x, 7.x	
	Microsoft SilverLight Expression (match VS)	
	Microsoft Team Foundation System 2010	
	Microsoft Visual Studio 2008, 2010	
	Oracle JDeveloper 11g	
	Spring 2.5	
	Struts 2.x	
	XML Spy 2010	
	Other (explain =>)	
<b>16</b>	<b>Development Language</b>	<b>Comments</b>
	ASP .NET 2008, 2010	
	CSS Level 3	
	Microsoft C#	
	Microsoft VB.Net	
	Java	
	JavaScript	
	JDK 6.x, 7x	
	PHP 5.3.x	
	Other (explain =>)	
(continued)		



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>17</b>	<b>Markup languages</b>	<b>Comments</b>
	HTML 4 & 5	
	XML Schema 1.1	
	XSLT 2.0	
	XHTML 2.0	
<b>18</b>	<b>Presentation (Web) Server</b>	<b>Comments</b>
	Apache HTTPD 2.x	
	IBM Websphere IHS (match app svr)	
	Microsoft IIS 7.0	
	Other (explain =>)	
<b>19</b>	<b>Application Server</b>	<b>Comments</b>
	.NET Framework 3.5, 4.0	
	Apache Tomcat 7.x	
	IBM WebSphere 7.0, 8.0	
	JBoss 5.x, 6	
	Other (Explain)	
<b>20</b>	<b>HW Platform</b>	<b>Comments</b>
	Dell	
	HP	
	Sun	
	Unisys Mainframe	
	x86 Virtualization	
	Other (explain =>)	
<b>21</b>	<b>Server OS</b>	<b>Comments</b>
	Linux Redhat Enterprise Server 5.x, 6.x	
	Linux SUSE Enterprise 11.x	
	Microsoft Windows 2008	
	Unix HPUX 11i v3	
	Unix Sun Solaris 10.x, 11.x	
	VMWare vSphere 4, 5, VCD	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>22</b>	<b>Document Management</b>	<b>Comments</b>
	Captaris Alchemy 8.3	
	FileNet Content Services 5.4	
	FileNet Document Mgmt P8	
	HP Trim	
	MS SharePoint Server 2007 EE	
	Other (explain =>)	
<b>23</b>	<b>Centralized Printing</b>	<b>Comments</b>
	DMB consolidated print center	
	Other (explain =>)	
<b>24</b>	<b>Testing Tools</b>	<b>Comments</b>
	Junit 4.x	
	LoadRunner 11.x	
	Microsoft Team Foundation System	
	Quick Test Pro 11.x	
	Selenium 1.x, 2.x	
	Other (explain =>)	
<b>25</b>	<b>Identity Management (network)</b>	<b>Comments</b>
	Active Directory 2008	
	Other (explain =>)	
<b>26</b>	<b>Identity Management (application)</b>	<b>Comments</b>
	IBM Tivoli SSO (TIM-TAM)	
	Microsoft Active Directory 2008	
	Other (explain =>)	
<b>27</b>	<b>Project Management</b>	<b>Comments</b>
	Clarity 12.x	
	MS Project 2007, 2010	
	Rational	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>28</b>	<b>Requirements Gathering</b>	<b>Comments</b>
	Compuware Optimal Trace 5.x	
	Microsoft Office	
	Microsoft Visio	
	SUITE/SEM templates	
	Rational Requisite	
	Serena Dimensions 2009 R1.x, 11.2	
	Other (explain =>)	
<b>29</b>	<b>Design Tools</b>	<b>Comments</b>
	Microsoft Visio	
	MSSQL Server Mgmt Studio (match db)	
	Rational Rose	
	Serena Prototype Composer 2009, 2010	
	Other (explain =>)	
<b>30</b>	<b>Version Control</b>	<b>Comments</b>
	Microsoft Team Foundation System	
	Serena Dimensions (PVCS Mgr) 2009, 12.1	
	Subversion 1.6	
	Other (explain =>)	
<b>31</b>	<b>Message Queuing</b>	<b>Comments</b>
	Apache Active MQ 5.3	
	IBM Websphere MQ 6.x, 7.x	
	Other (explain =>)	
<b>32</b>	<b>Business Integration</b>	<b>Comments</b>
	JBoss SOA	
	Websphere Message Broker 6.x, 7.x	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>33</b>	<b>Database Tools</b>	<b>Comments</b>
	DBArtisan 8.6, 8.7	
	Infosphere Information Svr v8.1.x	
	MSSQL Server Mgmt Studio (match db)	
	MySQL Workbench (match db)	
	Oracle Developer Suite (match db)	
	Oracle Enterprise Manager (match db)	
	Oracle SQL Developer (match db)	
	Rapid SQL 7.6 & 7.7	
	TeraData Utilities (match db)	
	Toad 9.x & 10.x	
	Other (explain =>)	
<b>34</b>	<b>Reporting Tools</b>	<b>Comments</b>
	ActivePDF 2009	
	ActiveReports 4.0	
	Birt 3.7	
	Crystal Reports 2008	
	Crystal Xcelsius 2008	
	Crystal Reports for Eclipse	
	MSSQL Reporting Services (match db)	
	Oracle Reports (match db)	
	Other (explain =>)	
<b>35</b>	<b>End-User Tools</b>	<b>Comments</b>
	Business Objects (BO) XI R2, 3.x, 4.x	
	Oracle Discoverer (match db)	
	Other (explain =>)	
<b>36</b>	<b>Deployment Tools</b>	<b>Comments</b>
	Microsoft Team Foundation System 2008	
	Serena Dimen.CM Mover 2009, 2.3, 12.1	
	Other (explain =>)	

(continued)



Select all that apply ✓ (vendor complete)	<b>Enterprise Architecture Solution Assessment</b>	
	<b>Architecture Overview (continued)</b>	
	<i>Vendor: the technologies listed below are standards used by the State of Michigan. Utilization of existing technology for new solutions is encouraged. Check the left column if the technology can be used with the solution being proposed. Add comments as needed.</i>	
<b>37</b>	<b>Build Tools</b>	<b>Comments</b>
	Apache Ant 1.7.x, 1.8.x	
	Apache Maven 2.2, 3.0	
	Microsoft Team Foundation System	
	Serena Dimensions CM Builder 2009 R1.x	
	Other (explain =>)	
<b>38</b>	<b>Job Schedulers</b>	<b>Comments</b>
	BL/Sched 5.0, 5.2	
	OpCon XPS 4.x, 5.x	
	Tidal Enterprise Scheduler 5.3.1 & 6.x	
	UC4 App Mgr 8.0	
	UC4 Op Mgr 6.0 & 8.0	
	Other (explain =>)	
<b>39</b>	<b>GIS Technologies</b>	<b>Comments</b>
	ArcIMS 9.3	
	ArcGIS Server 9.3	
	ArcSDE 9.3	
	Erdas ADE Rel. 2	
	ER Mapper Image Server 7.2	
	Oracle Spatial (match db)	
	Oracle MapView (match db)	
	Other (explain =>)	
<b>40</b>	<b>Issue &amp; Defect Tracking</b>	<b>Comments</b>
	Bugzilla 3.2.5 & 3.4.2	
	BugTracker .Net 3.5	
	Clear Quest Chg Mgmt Suite 7.5	
	Microsoft Team Foundation System	
	Serena Mashup Composer 2009 R1.x	
	Other (describe =>)	



## Enterprise Architecture Solution Assessment

### Disaster Planning (Section to be completed by SOM)

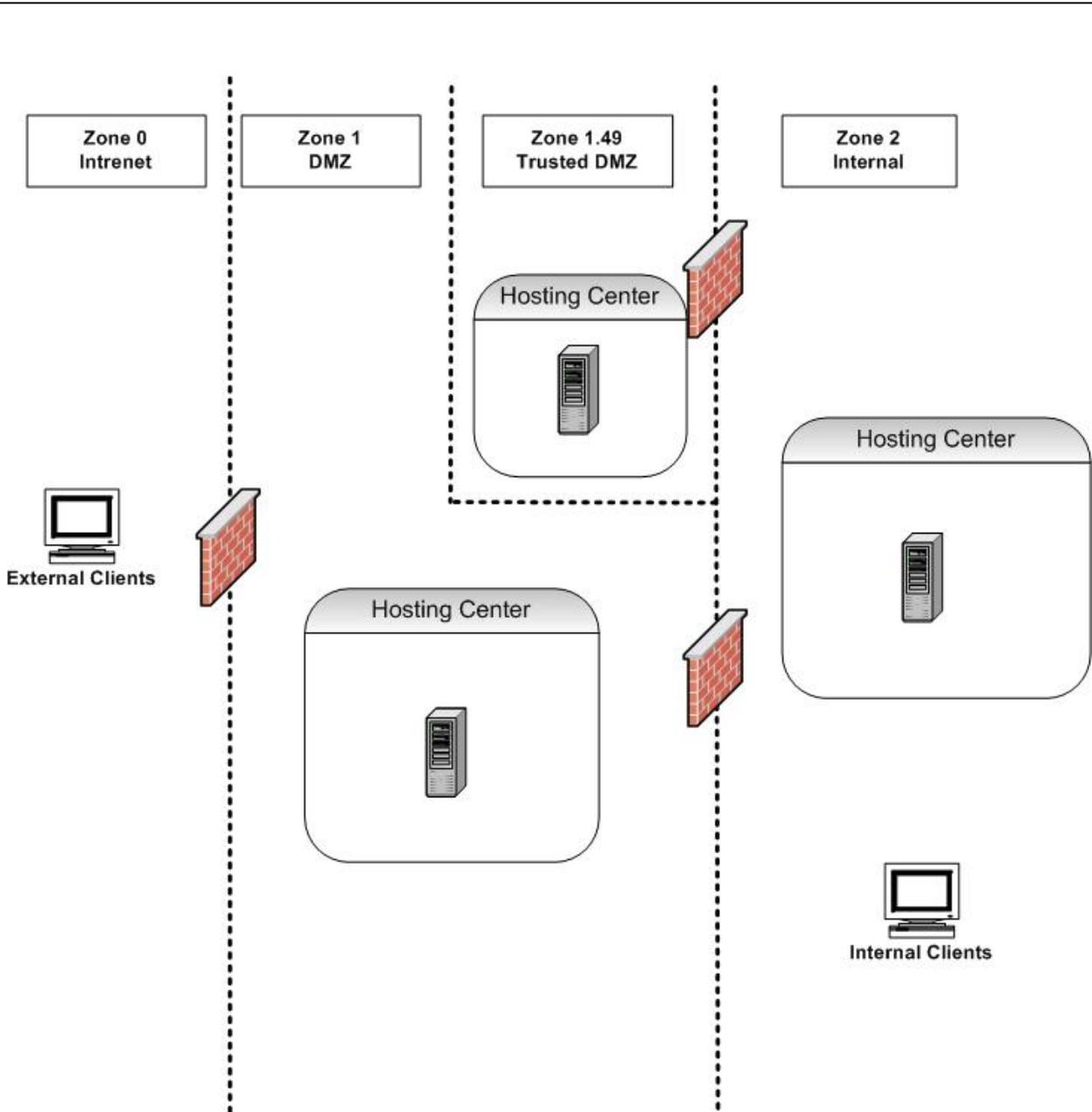
<b>Business continuity requirements.</b>	<b>Describe below</b>		
The business requirement(s) that determine the amount of time and the operational availability of the application to the end-user.	<to be completed by SOM prior to inclusion in Contract>		
<b>Select Only One (1)</b>	<b>Availability Requirement Category – Availability Requirement is divided into three different levels. These levels define the continuous service availability requirements of the application. Based on the following definitions, please indicate the level of availability required for this Business Function / Application.</b>		
<SOM>	<b>Urgent</b> - Business Function / Application outage has potential to cause loss of life or risk of injury to a citizen. 99.99% availability (<45 minutes of downtime / month). If an Urgent priority application is not available, DIT will work to resolve the incident 7 x 24 x 365. If the incident occurs after normal business hours, on-call staff (where available) will be called in to resolve the incident. DIT staff will continue to work the issue during and after business hours until the incident is resolved, and the application service restored.		
<SOM>	<b>High</b> – Business Function / Application outage will have a high non-life threatening impact on the public. If this application is not available, there may be an adverse impact on a large number of business clients who use the application. The lack of application availability may also be considered politically sensitive. 99.5% availability (<3.5 hours of downtime / month). DIT will work to resolve the incident 7 x 24 x 365. If the incident occurs after normal business hours, on-call staff (where available) will be called in to resolve the incident. DIT staff will continue to work the issue during and after business hours until the incident is resolved, and the application service restored.		
<SOM>	<b>Medium</b> – Business Function / Application not meeting the Urgent or High criteria will be assigned Medium priority status; this default will be considered the third priority and reflect a situation where there is no risk of personal injury, and the public is not being directly effected. 98% availability (<15 hours of downtime / month). If there is an issue with a medium priority application, work to resolve the incident will be handled during normal DIT Business hours (typically 8:00 am-5:00 pm, Monday-Friday. If the problem is not resolved at the end of the business day, staff will return to work the next business day, and continue the resolution process until the service is restored		
<b>Recovery Point and Time Objectives</b>			
<b>Select Only One (1)</b>	<b>Recovery Point Objective (RPO) is the maximum amount of data loss a business function can sustain during an event.</b>	<b>Select Only One (1)</b>	<b>Recovery Time Objective (RTO) is the maximum amount of time that can elapse until a system / application / function must be returned to service.</b>
<SOM>	2 hours	<SOM>	2 hours
	4 hours		4 hours
	6 hours		6 hours
	8 hours		8 hours
	24 hours		24 hours
	72 hours		72 hours
	Other		Other



# Enterprise Architecture Solution Assessment

## Server/Network Diagram (vendor version)

Diagrams are useful to illustrate the interaction of technologies. The "Server/Network Diagram" is intended to allow the EA (Enterprise Architecture) Core Team to understand the relationship between the system components. Below is an example illustrating the network components deemed necessary. Vendors may use their own format so long as adequate information is conveyed.



**State of Michigan Network Diagram Example**

Network example only  
To be completed by vendor



**Enterprise Architecture Solution Review**

**Cost Analysis (vendor version)**

**Contractor:** The intent of the Cost Analysis is to gather an estimate of the long term maintenance and support costs which will be incurred by State of Michigan if the Contractors solution is selected. Please complete this section to the best of your ability given the limited information available at this time.

**Buyer:** If long term cost estimate(s) are requested elsewhere in the Contract please delete this section.

No.	Cost Categories	Cost (\$)	
A.	<b>COTS/Application software update</b>		
	(Includes licensing and updates each year)		
	1. First Year (after one year warranty)		
	2. Second Year		
	3. Third Year		
	4. Fourth Year		
B.	<b>Maintenance and support</b>		
	(includes all programming and DB administration functions for implementing future business requirements)		
	1. First Year		
	2. Second Year		
	3. Third Year		
	4. Fourth Year		
	<b>Total Recurring Cost</b>	<b>\$</b>	



Attachment G

# STATE OF MICHIGAN



Under the awarded Contract, and as part of the option for Data as a Service, Contractor will be required to fill out and complete this attachment as part of the deliverables specified in Article 1.104 Section C – Data As A Service, Hosting Implementation And Operations Services.

*Department or Agency*  
*Title of Application*

*Technology, Management and Budget*  
*Project Security Plan & Assessment*

Prepared by:  
Date:

	Initiation & Planning	Requirements Definition	Functional Design	System Design	Construction	Testing	Implementation	Operations/Maintenance	Disposal
Lifecycle Stage	<input type="checkbox"/>								

MCS USE ONLY			
C	I	A	Total Score
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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## Revision History

Name	Date	Reason for Change	Version



## 1.0 Introduction

Including security early in the life cycle of a project will usually result in less expensive and more effective security than adding it to an operational system. This document presents a guide for incorporating security into the Systems Engineering Methodology (SEM) of the State Unified Information Technology Environment (SUITE) Model. This document will help agencies select and acquire cost-effective security controls by explaining how to include information system security requirements within the appropriate stages of the SEM.

SEM includes the following stages: Initiation & Planning, Requirements Definition, Functional Design, System Design, Construction, Technical Testing, and Implementation. Each of these stages identifies minimum security needed to effectively incorporate security into a system during its development.

This document serves as documentation of the structured process of planning adequate, cost-effective security protection for a system. This document contains detailed technical information about the system, its security requirements, and the controls implemented to provide protection against its risks and vulnerabilities. This document, at a minimum, is marked, and should be handled and controlled as a sensitive document. This document is submitted to obtain a formal security sign off from the sponsors. The lack of sign-off may prevent the security elements of this project from proceeding to production.

### 1.1 Resource Roles and Responsibilities

*Insert Matrix*

"Click [HERE](#) and Type"

Or

Completed DIT Form PMM-02, Project Charter

## 2.0 Current Status

*This section documents the current status of the software/project. If the application is new and has never existed before, this section can be skipped.*

"Click [HERE](#) and Type"

## 3.0 SEM Initiation and Planning Stage

This is the first stage in the SEM lifecycle of the project. This stage involves the establishment of a need for a new system or enhancements to an existing system, the data that is being collected or handled, and which policies or standards need to be addressed in the design phase. This stage will also classify the data handled by the project based on Federal NIST Guidelines.

### 3.1 Purpose

*This section documents the purpose of the application/project, including the business problem to be solved or reason for changes that need to be made to the current status of the application/project.*



"Click [HERE](#) and Type"

**3.2 Laws, Regulations, DTMB and/or Agency Security Policies, Standards and Procedures**

The State of Michigan information is a valuable asset that must be protected from unauthorized disclosure, modification, use, or destruction. Prudent steps must be taken to ensure that its integrity, confidentiality, and availability are not compromised. Laws, regulations, policies, standards and procedures have been developed to provide a secure environment for developing, implementing, and supporting information technology and systems. The system must comply with all applicable laws, both state and federal, and any additional regulations and guidelines established by the agency or DTMB. Below is a list of some of the applicable laws, regulations, policies, standards and procedures many systems must comply with. This is not an all inclusive list and short explanations are supplied in Appendix D:

- Identity Theft Protection Act (Senate Bill No. 309), Public Act 566 of 2006, amending Act 452 of 2004
- Social Security Number Privacy Act (Senate Bill No. 795, Public Act 454 of Public Acts 2004)
- 1305 SOM Enterprise Information Technology Policy
- 1310.03 Active Directory Password Standard
- 1315.00 Policy for Storage of Sensitive Information on Mobile Devices & Portable Media
- 1315.10 Standard for Electronic Data Encryption
- 1325 Information Technology Security Awareness Policy
- 1335 Information Technology Access Control Policy
- 1340 Information Technology Information Security Policy
- 1345 Information Technology Network and Infrastructure Policy
- 1350.11 Security Operational Guidelines for Servers
- 1350.20 Authorization Access to Data Sources
- 1350.40 Access Control Criteria for Data Sources
- 1350.90 Secure Disposal of Installed & Removable Digital Media
- 1355 Project Management Methodology Policy
- 1360 Systems Engineering Methodology Policy
- 1390 Information Technology Continuity of Business Policy
- 1410.21 Procurement and Usage of State Wireless Devices – Usage of PDAs, Blackberrys, phones, and pagers
- 1420.00 Wireless – Usage and deployment of wireless LANs and equipment.

"Click [HERE](#) and Type"

**3.3 Data classification**

*Does this project collect Social Security Numbers, Drivers License Numbers, Credit Card Numbers, or other potentially sensitive information?*

"Click [HERE](#) and Type"



*Does the hardware supporting this project also support other projects that handle sensitive information?*

"Click [HERE](#) and Type"

**3.4 System and Information Security Level (Low, Moderate, High)**

The System and Information Security Level Matrix (see Appendix A for guidelines pertaining to data classification) is used to determine the overall security level categorization of your information, application, and the interconnectivity of other systems used by your application. This categorization will determine the appropriate security controls that need to be implemented. Your Security Liaison can assist you.

(This system categorization is based on FIPS Publication 199 and NIST 800-60 ver. 2.0)

<b>Category</b>	<b>Application/Data (Classification of data handled by this project/application)</b>	<b>Systems* (Classification of data handled by other applications that are also installed on this server hardware)</b>	<b>Overall Security Level</b>
<b>Confidentiality</b>			
<b>Integrity</b>			
<b>Availability</b>			

Based on the System and Information Security Level Matrix, the “Overall Security Level” categorization of your application system has been rated a “Enter Overall Security Level rating” level in regards to Confidentiality, Integrity, and Availability risk.

\* This rating is based on the most sensitive information.

**4.0 SEM IT Business/Security Requirements Stage**

The primary goal of this stage is to identify the security requirements for the project. These security requirements become the initial baseline for product design and a reference for determining whether the completed product performs as the system owner requested and expected. All system security requirements, (e.g., software, hardware, performance, functional, infrastructure, etc.) should be evaluated and included in the requirements gathering process.

NIST Special Publication 800-53 was selected as a baseline of minimum security controls to protect the system, information, and apply tailoring guidance as necessary. These detailed security controls are contained in Appendix B of this document.

The required security controls for your application are based on the previous section’s Data Classification (Section 3.3)/System and Information Categorization (Section 3.4) “Overall Security Level” (Low, Moderate, High).

- If your application is determined to be “**Low**”, you need only to implement the controls in the Low columns of Appendix B.



- If your application is determined to be “**Moderate**”, you must implement all controls in the Low and Moderate columns of Appendix B.
- If your application is determined to be “**High**”, you must implement all controls in the Low, Moderate, and High columns of Appendix B.

The detailed NIST security controls in Appendix B are rolled together into higher level groups and for speed of documentation these security control groups can be checked off as the project design proceeds through the Functional & System Design Stages (Stage 5 & 6) and the appropriate SUITE SEM templates are completed.

If SEM templates are completed and on file with the project manager, place a check mark in the associated box for that template indicating the documentation for that security group in the DIT-0170 can be obtained from those templates and it need not be duplicated here.

Any control groups not implemented may be flagged as a risk by the Security Liaison in the final Risk Analysis Section (Section 9) and additional controls may be recommended before implementation.

**"Click HERE and Type"**

## **5.0 & 6.0 SEM Functional and System Design Stage**

During this stage, the overall structure of the product is defined from a Functional & System viewpoint. The Functional & System design describes the logical system flow, data organization, system inputs and outputs, processing rules, operational characteristics of the product from the user’s point of view and documents that the Security Control Groups have been implemented in the design.

### **5.1/6.1 Describe the function of the system/application and the information processed for each server utilized in this project.**

*List each server name and then describe how each server will be utilized in the project.*

**"Click HERE and Type"**

- Completed SEM-501 (Functional Design Document)

### **5.2/6.2 Other Systems or Applications serviced by this hardware**

- Other Information Security Assessments (DIT-0170) are reviewed and updated for other systems or applications serviced by this same hardware (Section 3.2 & 3.3) to now include this project’s information.

### **5.3/6.3 Hardware this system/application will be utilizing**

- Solutions Engineering form for hosting the hardware is completed

### **5.4/6.4 Security Control Groups Implemented in the Project**



Check the Security Control Groups being implemented for this project to provide for the protection of the Agency's assets. These Security Control Groups are a high level representation of the most critical of the detailed Security Controls that are listed in Appendix B. The detailed controls should be reviewed to ensure that each control within the group is implemented in accordance with the Overall Security Level of this application/project.

**Access Control:** (See Appendix B for individual control details.)

○ Organizations must limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems) and to the types of transactions and functions that authorized users are permitted to exercise.

- Process in place for management of accounts which includes separation of duties.
- Follows M1 guidelines including unique IDs for every user.
- Utilizes Role based controls and least privilege.

**Awareness & Training:** (See Appendix B for individual control details.)

○ Organizations must: (i) ensure that managers and users of organizational information systems are made aware of the security risks associated with their activities and of the applicable laws, Executive Orders, directives, policies, standards, instructions, regulations, or procedures related to the security of organizational information systems; and (ii) ensure that organizational personnel are adequately trained to carry out their assigned information security-related duties and responsibilities.

○

- Personnel and system users receive appropriate security training
- Completed SEM-0703 (Training Plan) and included Security and Awareness training
- Completed SEM-0704 (Training Checklist)

**Audit & Accountability:** (See Appendix B for individual control details.)

○ Organizations must: (i) create, protect, and retain information system audit records to the extent needed to enable the monitoring, analysis, investigation, and reporting of unlawful, unauthorized, or inappropriate information system activity; and (ii) ensure that the actions of individual information system users can be uniquely traced to those users so they can be held accountable for their actions.

- System generated audit logs are written, stored securely, and they are reviewed regularly.

**Certification, Accreditation, & Security Assessments:** See Appendix B for individual control details.)

○ Organizations must: (i) periodically assess the security controls in organizational information systems to determine if the controls are effective in their application; (ii) develop and implement plans of action designed to correct deficiencies and reduce or eliminate vulnerabilities in organizational information systems; (iii) authorize the operation of organizational information systems and any associated information system connections; and (iv) monitor information system security controls on an ongoing basis to ensure the continued effectiveness of the controls.

- Completed DIT-0170 is reviewed by the Office of Cyber Security, and the Agency approves the information system security assessment before full implementation.

**Configuration Management:** (See Appendix B for individual control details.)



- Organizations must: (i) establish and maintain baseline configurations and inventories of organizational information systems (including hardware, software, firmware, and documentation) throughout the respective system development life cycles; and (ii) establish and enforce security configuration settings for information technology products employed in organizational information systems

- - Hardware and Software are listed in CMDB and follow the hardening and change control process.
  - Completed SEM-0302 (Software Configuration Management Plan)

**Continuity Planning/Disaster Recovery:** (See Appendix B for individual control details.)

- Organizations must establish, maintain, and effectively implement plans for emergency response, backup operations, and post-disaster recovery for organizational information systems to ensure the availability of critical information resources and continuity of operations in emergency situations.

- Business Continuity Plan is in place
- Business Application Criticality Request (DIT-0208) completed if appropriate
- Disaster Recovery Plan is in place
- Backups of system are performed and stored in off site location
- Backups are tested for restore capability
- Business Continuity Plan and Disaster Recovery Plan are tested.

**Identification & Authentication:** (See Appendix B for individual control details.)

- Organizations must identify information system users, processes acting on behalf of users, or devices and authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to organizational information systems.

- Unique identification of user is accomplished through use of passwords, tokens, or biometrics following M1 guidelines
- Authentication system meets requirements of applicable laws, policies, and standards

**Incident Response:** (See Appendix B for individual control details.)

- Organizations must: (i) establish an operational incident handling capability for all components and data of organizational information systems that includes adequate preparation, detection, analysis, containment, recovery, and user response activities; and (ii) track, document, and report incidents to appropriate organizational officials and/or authorities.

- Organization has a documented incident response process per above

**Maintenance:** (See Appendix B for individual control details.)

- Organizations must: (i) perform periodic and timely maintenance on organizational information systems; and (ii) provide effective controls on the tools, techniques, mechanisms, and personnel used to conduct information system maintenance.

- Completed SEM-0301 Maintenance Plan
- Only authorized personnel are allowed to perform maintenance
- Change control process is utilized for all maintenance



**Media Protection:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) protect information system media, both paper and digital; (ii) limit access to information on information system media to authorized users; and (iii) sanitize or destroy information system media before disposal or release for reuse.

- Only authorized users have access to information either printed or electronic
- Media is sanitized and disposed of in accordance with DTMB policies
- Sensitive (PII) information is stored and transported in encrypted form

**Physical & Environmental Protection:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) limit physical access to information systems, equipment, and the respective operating environments to authorized individuals; (ii) protect the physical plant and support infrastructure for information systems; (iii) provide supporting utilities for information systems; (iv) protect information systems against environmental hazards; and (v) provide appropriate environmental controls in facilities containing information systems.

- System is located in Lake Superior, Lake Ontario, or Traverse Bay Hosting Center
- Completed SEM DIT-0184 (Infrastructure Service Request)

**Planning:** *(See Appendix B for individual control details.)*

○ Organizations must develop, document, periodically update, and implement security plans for organizational information systems that describe the security controls in place or planned for the information systems and the ethical rules of behavior for individuals accessing the information systems. O

- Information Security Assessment (DIT-0170) is regularly reviewed and updated
- Contractors have signed Non-disclosure Agreement (DIT-0049) before access is allowed
- Users have signed End User Computing Agreement (DIT-0929) before access is allowed

**Personnel Security:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) ensure that individuals occupying positions of responsibility within organizations (including third-party service providers) are trustworthy and meet established security criteria for those positions; (ii) ensure that organizational information and information systems are protected during and after personnel actions such as terminations and transfers; and (iii) employ formal sanctions for personnel failing to comply with organizational security policies and procedures.

- Background checks (DIT-0021) have been performed where appropriate
- SLAs are signed before allowing Inter-agency access
- Non-Disclosure Contractor Security Agreements (DIT-0928) have been completed and signed where appropriate

**Risk Assessment:** *(See Appendix B for individual control details.)*

○ Organizations must periodically assess the risk to organizational operations (including mission, functions, image, or reputation), organizational assets, and individuals, resulting from the operation of organizational information systems and the associated processing, storage, or transmission of organizational information.



- Information Security Risk Assessment (DIT-0170) is completed
- Security Scans are regularly performed and vulnerabilities are mitigated

**System & Services Acquisition:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) allocate sufficient resources to adequately protect organizational information systems; (ii) employ system development life cycle processes that incorporate information security considerations; (iii) employ software usage and installation restrictions; and (iv) ensure that third-party providers employ adequate security measures to protect information, applications, and/or services outsourced from the organization.

- SUITE systems life cycle is used to procure, develop, and manage systems

**System & Communications Protection:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) monitor, control, and protect organizational communications (i.e., information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems; and (ii) employ architectural designs, software development techniques, and systems engineering principles that promote effective information security within organizational information systems.

- System has inactivity time out
- System Communications are encrypted when appropriate

**System and Information Integrity:** *(See Appendix B for individual control details.)*

○ Organizations must: (i) identify, report, and correct information and information system flaws in a timely manner; (ii) provide protection from malicious code at appropriate locations within organizational information systems; and (iii) monitor information system security alerts and advisories and take appropriate actions in response.

- System employs malicious code protection techniques (i.e., SQL Injection)
- System restricts data input to authorized personnel only

**Vendor, contractor & third party:** *(See Appendix B for individual control details.)*

- Remote access is secured through VPN
- Security agreements are signed, maintained and reviewed yearly

**Infrastructure/Network:** *(See Appendix B for individual control details.)*

- Enterprise Architecture solution assessment is completed
- Network diagram is approved (email from Liaison) by Cyber Security based on DTMB network security standards
- Exceptions completed and approved for deviation to network standards or PCI compliance



## 5.5/6.5 Infrastructure/Network Diagram

*The network diagram depicts the way that the data is transported on the network equipment from one device to the next without regard to the physical interconnections of the devices.*

*Network diagram must be approved (email from Liaison) by Cyber Security based on DTMB network security standards*

*Furnish network diagram detailing infrastructure features*

*Include:*

- Specify name and location of the system/application*
- Servers/IP Addresses*
- Services*
- Database Names*
- Load Balances*
- Ports and Protocols*
- Encrypted Communication*
- Communication port numbers*

**"Click [HERE](#) and create / paste your diagram"**



### 5.6/6.6 Data Flow Diagram

*Describe data process flow of the application from system input to system output.*

- *Furnish diagram*
- *Describe interface and how it is accomplished*
- *Identify data flow*
- *Type of data*
- *Direction of flow*

**"Click [HERE](#) and paste diagram"**

**Or**

- Completed SEM-0604 (System Design Document)
- Completed SEM-0605 (System Design Checklist)

*If a completed SEM-0604 and SEM-0605 are on file with the project, Section 5.6/6.6 **Data Flow Diagram** can be check marked above and completion of the DIT-0170 document can proceed to Section 7.0 **SEM Construction Stage**.*



## 7.0 SEM Construction Stage

In this stage, confirmation that sensitive data or data under conversion is handled and protected correctly based on classification.

- Completed SEM-0701 (Transition Plan)
- Completed SEM-0601 (Conversion Plan)

## 8.0 SEM Testing Stage

In this stage, security controls are tested to determine whether the sensitive data or data under conversion is handled and protected based on classification.

*Is there a test plan?*

"Click [HERE](#) and Type"

*Are roles and responsibilities tested?*

"Click [HERE](#) and Type"

*Is there separation of duties implemented?*

"Click [HERE](#) and Type"

- Completed SEM-0602 (Test Plan)

## 9.0 SEM Implementation Stage

In this stage, Qualys scans are performed, security training is performed and security controls are validated. A final security analysis is provided, identifying residual risks of which DTMB and the agency approve.

*Every PCI vulnerability must be covered by one of three scenarios*

1. Remediated by patch or version.
2. False Positive (documented, submitted to MCS, and approved).
3. Exception Request (documented, submitted to TRB, and approved).

### 9.1 Security Analysis (To be completed by MCS Security Liaison)

- o See Appendix E.



**9.2 Sponsors and Stakeholders**

"Click [HERE](#) and Type"

**9.3 Approvals**

By signing below, I certify that I have read and acknowledge all sections of this document and each residual risk and recommended control (Appendix E) contained in Section 9. My signature indicates that the Agency has accepted each residual risk if the corresponding recommended control is not implemented.

**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
(Project Manager)

By signing below, I certify that I have read and acknowledge Sections 2, 3, 4, 5.4/6.4, 9, and each residual risk and recommended control contained in Appendix E of this document. My signature indicates that the Agency accepts each residual risk if the corresponding recommended control is not implemented.

**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
(Business Owner)

By signing below, I certify that I have read and acknowledge all sections of this document and each residual risk and recommended control (Appendix E) contained in Section 9. My signature indicates that the Agency has accepted each residual risk if the corresponding recommended control is not implemented.

**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
(Client Service Director)

By signing below, Office of Cyber Security believes that all information and sections of this document are accurate and complete to the best of the information provided. Each residual risk and recommended control (Appendix E) contained in Section 9 has been reviewed and the Agency has accepted each residual risk if the corresponding recommended control is not implemented.

**Approved by:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
(Office of Cyber Security)



**Appendix A - System and Information Security Level Matrix**

Security Objective	Potential Impact		
	Low	Moderate	High
<p><b>Confidentiality:</b></p> <p>Preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information.</p>	<p>The unauthorized disclosure of information would have <b>limited</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Public Information</li> <li>○ Information available via Freedom of Information Act</li> </ul>	<p>The unauthorized disclosure of information would have a <b>serious</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Personal information affecting an individual's privacy (e.g. an individual's medical information; driver's license number; social security number; banking information, etc...)</li> </ul>	<p>The unauthorized disclosure of information would have a <b>severe or catastrophic</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Highly sensitive information that may affect human life or safety (e.g. under cover investigation information; confidential response plans for emergencies)</li> <li>○ Information that if released would violate State or Federal Law</li> <li>○ Significant amount of privacy information (e.g. thousands of individuals credit card numbers; social security numbers; banking information; medical information, etc...)</li> </ul>



	Low	Moderate	High
<p><b>Integrity:</b></p> <p>Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity.</p>	<p>The unauthorized modification or destruction of information would have <b>limited</b> adverse effect on State of Michigan operations, assets, or individuals.</p>	<p>The unauthorized modification or destruction of information would have a <b>serious</b> adverse effect on State of Michigan operations, assets, or individuals.</p>	<p>The unauthorized modification or destruction of information would have a <b>severe or catastrophic</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Information that could affect human life or safety (e.g. criminal history; warrant/arrest data; active investigation information; child protection services information)</li> <li>○ Information that could severely affect public confidence (e.g. modification of voter registration or voting results; tax information; lottery drawings)</li> </ul> <p>Information that may affect national security (e.g. birth certificates; emergency response plans and procedures; risk assessments and vulnerability information)</p>



	<b>Low</b>	<b>Moderate</b>	<b>High</b>
<p><b>Availability:</b></p> <p>Ensuring timely and reliable access to and use of information and systems.</p>	<p>The disruption of access to or use of information or an information system would have <b>limited</b> adverse effect on State of Michigan operations, assets, or individuals.</p>	<p>The disruption of access to or use of information or an information system would have a <b>serious</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Information or information system that if not available, would seriously affect the public’s trust of the State (e.g. unemployment applications; Secretary of State applications; OTIS)</li> <li>○ Information or information system that if not available, could seriously affect the State financially (e.g. large revenue generating applications;)</li> </ul>	<p>The disruption of access to or use of information or an information system would have a <b>severe or catastrophic</b> adverse effect on State of Michigan operations, assets, or individuals.</p> <p>Example(s):</p> <ul style="list-style-type: none"> <li>○ Information or information system that if not available, could affect human life or safety (e.g. LEIN; prisoner tracking systems; emergency response systems)</li> <li>○ Information or information system that if not available, would severely affect the public’s trust of the State (e.g. welfare checks; food stamps; voter registration)</li> <li>○ Information or information system that if not available, could severely affect the State financially (e.g. Tax systems;</li> </ul>



## Appendix B - System Security Control Requirements

NIST 800-53 Control Name	Security Classification		
	Low	Moderate	High
<p><b>Access Control (AC)</b> Organizations must limit information system access to authorized users, processes acting on behalf of authorized users, or devices (including other information systems) and to the types of transactions and functions that authorized users are permitted to exercise.</p>	<ul style="list-style-type: none"> <li>● Access Control Policy &amp; Procedure documented, reviewed and updated (AC-1)</li> <li>● Management of accounts (AC-2)</li> <li>● Comply with DTMB and Agency policies and procedures</li> <li>● A unique user ID and password is required for access (AC-3)</li> <li>● Tighten default settings to prevent unauthorized access</li> <li>● Disable inactive accounts</li> <li>● Terminate temporary and emergency accounts</li> <li>● The system automatically locks an account until released by an administrator when five unsuccessful attempts is exceeded (AC-7)</li> <li>● Remote Server Access is authenticated using 2-factors and/or VPN</li> <li>● System displays an approved message of use restrictions before granting access. (AC-8)</li> <li>● Review audit records (e.g., user activity logs) on a regular basis. (AC-13)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>● Automatically terminate temporary and emergency accounts</li> <li>● Automatically disable inactive accounts</li> <li>● Role based access controls must be applied to databases, applications, or computer hosts that contain protected information. (AC-4)</li> <li>● Firewall rules, Access Control Lists. (AC-4)</li> <li>● Separation of Duties through assigned access authorizations. (AC-5)</li> <li>● Initiate session lock after period of inactivity. (AC-11)</li> <li>● Initiate disconnect on remote connection after period of inactivity. (AC-12)</li> <li>● Access is deleted no later than day-end of the user's last day if the separation is friendly, or immediately if the separation is unfriendly</li> <li>● Least Privilege – Access restrictive set of rights/privileges or accesses needed. (AC-6)</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p> <ul style="list-style-type: none"> <li>● Auditing of account creation, modification, disabling and termination</li> <li>● Review audit records (e.g., user activity logs) on a daily basis</li> <li>● Removable hard drives or cryptography to protect information residing on portable and mobile devices</li> <li>● System limits the number of concurrent sessions. (AC-10)</li> <li>● Automated marking of outputs to identify special handling. (AC-15)</li> <li>● Transmitted minimum 128-bit encryption</li> </ul>



NIST 800-53 Control Name	Security Classification		
	Low	Moderate	High
	<ul style="list-style-type: none"> <li>Remote access is controlled. (AC-17)</li> <li>Inter-agency access is controlled. (AC-20)</li> <li>Separation of Duties</li> <li>Security Disclosure and Acceptable Use Agreements signed, maintained and reviewed on a yearly basis</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that access to security functions (hardware, software, and firmware) and information is restricted to authorized personnel</li> <li>Authentication and encryption is used to protect wireless access</li> <li>Mobile devices that access the system are scanned for malicious code, updated virus protection software, scan for critical software updates and patches. (AC-19)</li> </ul>	
<p>Awareness &amp; Training (AT)</p> <p>Organizations must: (i) ensure that managers and users of organizational information systems are made aware of the security risks associated with their activities and of the applicable laws, Executive Orders, directives, policies, standards, instructions, regulations, or procedures related to the security of organizational information systems; and (ii) ensure that organizational personnel are adequately trained to carry out their assigned information security-related duties and responsibilities.</p>	<ul style="list-style-type: none"> <li>A documented security awareness and training policy and procedure developed and distributed to all employees. (AT-1)</li> <li>System users receive security awareness training prior to authorizing access. (AT-2)</li> <li>Personnel who have significant system security roles or responsibilities receive appropriate security training based on that role. (AT-3)</li> <li>Document and monitor individual security training activities. (AT-4)</li> <li>All employees have a signed security agreement in their personnel file upon hire and renewed yearly</li> <li>Background check upon</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Information disclosure and confidentiality statements, are posted throughout the facility</li> </ul>	<p><b>All Low &amp; Moderate plus the following:</b></p>



NIST 800-53 Control Name	Security Classification		
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	hire and security exit interview upon termination (retire, transfers, terminations, etc.) <ul style="list-style-type: none"> <li>• Acceptable Use Policy</li> </ul>		
<b>Audit &amp; Accountability (AU)</b> Organizations must: (i) create, protect, and retain information system audit records to the extent needed to enable the monitoring, analysis, investigation, and reporting of unlawful, unauthorized, or inappropriate information system activity; and (ii) ensure that the actions of individual information system users can be uniquely traced to those users so they can be held accountable for their actions.	<ul style="list-style-type: none"> <li>• A documented audit and accountability policy (AU-1)</li> <li>• System generates Audit Records for Agency/DIT defined events. (AU-2)</li> <li>• Audit record should contain: data and time of the event, subject identity, type of event, how data changed, where the event occurred, and the outcome of the event. (AU-3) (AU-8)</li> <li>• Sufficient audit storage capacity should allocated. (AU-4)</li> <li>• System alerts if audit log generation fails. (AU-5)</li> <li>• System protects audit information from unauthorized access. (AU-9)</li> </ul>	<b>All Low plus the following:</b> <ul style="list-style-type: none"> <li>• Audit record should be reviewed on a regular basis. (AU-6)</li> <li>• Audit logs are stored for sufficient period of time. (AU-7) (AU-11)</li> </ul>	<b>All Low &amp; Moderate plus the following:</b> <ul style="list-style-type: none"> <li>• Audit record should be reviewed on a daily basis</li> <li>• System automatically processes audit records for events of interest. (AU-7(1))</li> </ul>
<b>Certification &amp; Accreditation (CA)</b> Organizations must: (i) periodically assess the security controls in organizational information systems to determine if the controls are effective in their application; (ii) develop and implement plans of action designed to correct deficiencies and reduce or eliminate vulnerabilities in	<ul style="list-style-type: none"> <li>• A documented security assessment policy and procedure that is consistent with applicable laws, Executive Orders, directives, policies, regulations, standards, and guidance and distributed to all employees. (CA-1)</li> <li>• Organization conducts an</li> </ul>	<b>All Low plus the following:</b>	<b>All Low &amp; Moderate plus the following:</b>



NIST 800-53 Control Name	Security Classification		
	Low	Moderate	High
<p>organizational information systems; (iii) authorize the operation of organizational information systems and any associated information system connections; and (iv) monitor information system security controls on an ongoing basis to ensure the continued effectiveness of the controls.</p>	<p>assessment of the security controls in all their information systems to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome. (CA-2)</p> <ul style="list-style-type: none"> <li>● Organization formally authorizes all connections from other information systems and carefully considers the risks that may be introduced. (CA-3)</li> <li>● Organization conducts an assessment of the security controls in all their information systems to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome and this assessment is reviewed by the Office of Cyber Security. (CA-4)</li> <li>● Organization develops and updates a plan of action and milestones for information systems to correct deficiencies noted during the assessment of security controls and to reduce or eliminate known vulnerabilities in the systems. (CA-5)</li> <li>● Organization formally authorizes and approves the information system security assessment before full implementation. (CA-6)</li> <li>● Organization monitors the security controls in the information system on an ongoing basis. (CA-7)</li> </ul>		



NIST 800-53 Control Name	Security Classification		
	Low	Moderate	High
<p><b>Configuration Management (CM)</b> Organizations must: (i) establish and maintain baseline configurations and inventories of organizational information systems (including hardware, software, firmware, and documentation) throughout the respective system development life cycles; and (ii) establish and enforce security configuration settings for information technology products employed in organizational information systems</p>	<ul style="list-style-type: none"> <li>• A documented configuration management policy that addresses purpose, scope, roles, responsibilities, and procedures, developed and distributed to all employees. (CM-1)</li> <li>• Organization develops, documents, and maintains current baseline configuration of system. (CM-2)</li> <li>• Organization develops, documents, and maintains mandatory security configuration settings of system. (CM-6)</li> <li>• System components are documented with relevant ownership information. (CM-8)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>• Define the mechanism by which changes to applications, network, infrastructure or other IT components are planned, communicated, authorized, documented, tested, and coordinated.(CM-3)(CM-5)</li> <li>• System changes are monitored and security impact analyses are performed to determine the effects of the changes. (CM-4)</li> <li>• Organization configures system to provide only essential capabilities based on functions, ports, protocols, and/or services. (CM-7)</li> </ul>	<p><b>All Low &amp; Moderate plus the following:</b></p>
<p><b>Continuity Planning (CP)</b> Organizations must establish, maintain, and effectively implement plans for emergency response, backup operations, and post-disaster recovery for organizational information systems to ensure the availability of critical information resources and continuity of operations in emergency situations.</p>	<ul style="list-style-type: none"> <li>• A documented Continuity Planning policy that addresses purpose, scope, roles, responsibilities, and procedures, developed and distributed to all employees. (CP-1)</li> <li>• Develop, implement, and periodically review a continuity plan that addresses roles &amp; responsibilities, assigned individuals with contact information, and activities associated with restoring the system after a disruption or failure, (CP-2)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>• Train personnel in their contingency roles and responsibilities with respect to the information system and provides refresher training. (CP-3)</li> <li>• Test the contingency plan at least annually and initiate necessary corrective actions. (CP-4)</li> <li>• Backups of user-level and system-level information is stored at alternate storage site and is geographically separated from the primary storage</li> </ul>	<p><b>All Low &amp; Moderate plus the following:</b></p>



NIST 800-53 Control Name	Security Classification		
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	<ul style="list-style-type: none"> <li>Review Continuity Plan periodically and revise the plan based on system or personnel changes. (CP-5)</li> <li>Backups of user-level and system-level information stored at appropriately secured location. (CP-9)</li> <li>Mechanisms with procedures are in place to allow full system recovery and reconstitution to fully secure state. (CP-10)</li> </ul>	site. (CP-6) <ul style="list-style-type: none"> <li>Alternate processing site identified and agreements in place. (CP-7)</li> <li>Alternate site telecommunications are identified and agreements in place. (CP-8)</li> </ul>	
<p><b>Identification &amp; Authentication (IA)</b></p> <p>Organizations must identify information system users, processes acting on behalf of users, or devices and authenticate (or verify) the identities of those users, processes, or devices, as a prerequisite to allowing access to organizational information systems.</p>	<ul style="list-style-type: none"> <li>Identification and Authentication Policy &amp; Procedure documented, reviewed and updated (IA-1)</li> <li>Unique Authentication of a user's identity is accomplished through the use of passwords, tokens, biometrics. (IA-2)</li> <li>Management of accounts (IA-4)</li> <li>Authentication information (e.g., password or PIN) must never be disclosed to another user or shared among users. (IA-5)</li> <li>Authentication information feedback to user is obscured (e.g., asterisks in password field). (IA-6)</li> <li>Authentication systems employs methods that meet requirements of applicable laws, Exec Orders, policies, and standards. (IA-7)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Identify and authenticate devices (e.g., MAC, TCP/IP, etc.) (IA-3)</li> </ul>	<p><b>All Low &amp; Moderate plus the following:</b></p> <ul style="list-style-type: none"> <li>Authentication of a user's identity is accomplished through the use of multifactor passwords, tokens, or biometrics. (IA-2)</li> </ul>



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	Low	Moderate	High
<p><b>Incident Response (IR)</b>                      Organizations must: (i) establish an operational incident handling capability for organizational information systems that includes adequate preparation, detection, analysis, containment, recovery, and user response activities; and (ii) track, document, and report incidents to appropriate organizational officials and/or authorities.</p>	<ul style="list-style-type: none"> <li>Documented and implemented Incident Response Policy &amp; Procedure. (IR-1)</li> <li>Incident handling form for consistent, repeatable process for monitoring and reporting when dealing with incidents. (IR-4) (IR-5) (IR-6)</li> <li>Incident response resource identified to assist users in handling and reporting incidents. (IR-7)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Personnel trained in their incident response roles and responsibilities at least annually. (IR-2)</li> <li>Incident response testing at least annually (IR-3)</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p>
<p><b>Maintenance (MA)</b>                      Organizations must: (i) perform periodic and timely maintenance on organizational information systems; and (ii) provide effective controls on the tools, techniques, mechanisms, and personnel used to conduct information system maintenance.</p>	<ul style="list-style-type: none"> <li>A documented Maintenance policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (MA-1)</li> <li>Agency schedules, performs, documents, and reviews records of preventative and regular maintenance. (MA-2)</li> <li>Agency authorizes, monitors, and controls any remote maintenance. (MA-4)</li> <li>Agency allows only authorized personnel to perform maintenance. (MA-5)</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Agency approves, controls, and monitors the use of maintenance tools. (MA-3)</li> <li>Agency obtains maintenance support in a timely manner. (MA-6)</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p>
		<b>All Low plus the</b>	<b>All Low and Moderate</b>



NIST 800-53 Control Name	Security Classification		
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<p><b>Media Protection (MP)</b> Organizations must: (i) protect information system media, both paper and digital; (ii) limit access to information on information system media to authorized users; and (iii) sanitize or destroy information system media before disposal or release for reuse.</p>	<ul style="list-style-type: none"> <li>• A documented Media Protection policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (MP-1)</li> <li>• Agency ensures that only authorized users have access to information in any media, printed or digital. (MP-2)</li> <li>• Media is sanitized and disposed of based on DTMB and Agency policies and procedures. (MP-6)</li> </ul>	<p><b>following:</b></p> <ul style="list-style-type: none"> <li>• Track, document and verify media destruction and disposal actions</li> <li>• Paper and digital media is stored in a secure storage area and audit of access attempts and access granted is documented. (MP-4)</li> <li>• Agency restricts the pickup, receipt, transfer, and delivery of media to authorized personnel. (MP-5)</li> </ul>	<p><b>plus the following:</b></p> <ul style="list-style-type: none"> <li>• Agency affixes external labels to removable media and output indicating distribution restrictions, handling caveats and applicable security markings. (MP-3)</li> <li>• Digital media stored at a minimum of 128-bit encryption</li> </ul>
<p><b>Physical &amp; Environmental (PE)</b> Organizations must: (i) limit physical access to information systems, equipment, and the respective operating environments to authorized individuals; (ii) protect the physical plant and support infrastructure for information systems; (iii) provide supporting utilities for information systems; (iv) protect information systems against environmental hazards; and (v) provide appropriate environmental controls in facilities containing information systems.</p>	<ul style="list-style-type: none"> <li>• A documented Physical and Environmental protection policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (PE-1)</li> <li>• Agency develops and keeps current a list of personnel with authorized access to facilities. (PE-2)</li> <li>• Agency controls all physical access points to facilities. (PE-3)</li> <li>• Agency monitors physical access to systems to detect and respond to security incidents. (PE-6)</li> <li>• Agency controls physical access to systems by authenticating visitors before allowing access to facilities. (PE-7)</li> <li>• Agency maintains visitor</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>• Agency controls physical access to system devices that display output. (PE-5)</li> <li>• Agency protects power equipment from damage and destruction. (PE-9)</li> <li>• Agency provides remote emergency shutoff. (PE-10)</li> <li>• Agency provides short term uninterruptible power supply for systems. (PE-11)</li> <li>• Agency maintains appropriate security controls for telecommuting or communications from alternate worksites. (PE-17)</li> <li>• Agency locates systems within facilities to minimize potential damage or unauthorized access.</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p> <ul style="list-style-type: none"> <li>• Agency controls physical access to system transmission lines within facilities. (PE-4)</li> </ul>



NIST 800-53 Control Name	Security Classification		
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	access records for facilities. (PE-8)  <ul style="list-style-type: none"> <li>Agency employs and maintains automatic emergency lighting. (PE-12)</li> <li>Agency employs and maintains fire suppression and detection systems. (PE-13)</li> <li>Agency employs and maintains temperature and humidity levels within the facilities. (PE-14)</li> <li>Agency employs water damage and detection systems in facilities. (PE-15)</li> <li>Agency controls, documents, and authorizes all delivery and removal of systems and related items entering and exiting the facilities. (PE-16)</li> </ul>	(PE-18)	
<p>Planning (PL)</p> <p>Organizations must develop, document, periodically update, and implement security plans for organizational information systems that describe the security controls in place or planned for the information systems and the rules of behavior for individuals accessing the information systems.</p>	<ul style="list-style-type: none"> <li>A documented Security Plan policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (PL-1)</li> <li>Agency develops, implements, and regularly reviews an Security Plan. (PL-2) (PL-3)</li> <li>Agency establishes an End User Computing agreement describing roles and responsibilities and expected behavior. Document is read, understood, and a signed</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Agency organizes and plans security related activities, assessments, maintenance, audits,.... (PL-6)</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p>



NIST 800-53 Control Name	Security Classification		
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	copy is retained before authorizing access. (PL-4)  • Agency conducts a privacy assessment of system. (PL-5)		
Personnel Security (PS) Organizations must: (i) ensure that individuals occupying positions of responsibility within organizations (including third-party service providers) are trustworthy and meet established security criteria for those positions; (ii) ensure that organizational information and information systems are protected during and after personnel actions such as terminations and transfers; and (iii) employ formal sanctions for personnel failing to comply with organizational security policies and procedures.	<ul style="list-style-type: none"> <li>• A documented Personnel Security policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (PS-1)</li> <li>• Agency heads shall designate every competitive service position within the agency at a high, moderate, or low risk level as determined by the position's potential for adverse impact to the efficiency and integrity of the service. (PS-2)</li> <li>• Agency screens individuals requiring access before authorizing access. (PS-3)</li> <li>• Agency conducts exit interviews upon termination of employees and terminates access to systems. (PS-4)</li> <li>• Agency reviews system and facility access upon reassignment of personnel. (PS-5)</li> <li>• Agency completes signed inter-agency access agreements before authorizing system access. (PS-6)</li> <li>• Agency establishes security requirements for</li> </ul>	All Low plus the following:	All Low and Moderate plus the following:



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	third party vendors and monitors their compliance. (PS-7) <ul style="list-style-type: none"> <li>Agency employs a formal sanction process for security non-compliance. (PS-8)</li> </ul>		
Risk Assessment (RA) Organizations must periodically assess the risk to organizational operations (including mission, functions, image, or reputation), organizational assets, and individuals, resulting from the operation of organizational information systems and the associated processing, storage, or transmission of organizational information.	<ul style="list-style-type: none"> <li>A documented Risk Assessment policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (RA-1)</li> <li>Agency categorizes their information in accordance with applicable laws, orders, and policies. (RA-2)</li> <li>Agency has a risk assessment done for systems, to identify magnitude of harm from breach, use, disclosure, modification, or destruction. (RA-3)</li> <li>Agency updates the risk assessment or whenever majors changes are performed. (RA-4)</li> <li>Agency regularly scans for vulnerabilities in the system. (RA-5)</li> </ul>	<b>All Low plus the following:</b>	<b>All Low and Moderate plus the following:</b>
System & Services Acquisition (SA) Organizations must: (i) allocate sufficient resources to adequately protect organizational information systems; (ii) employ system development life cycle	<ul style="list-style-type: none"> <li>A documented Systems and Services Acquisition policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all</li> </ul>	<b>All Low plus the following:</b> <ul style="list-style-type: none"> <li>Agency utilizes security engineering principles in system designs. (SA-8)</li> <li>Agency requires that system developers create</li> </ul>	<b>All Low and Moderate plus the following:</b> <ul style="list-style-type: none"> <li>Agency requires that system developers create and implement configuration management plans. (SA-10)</li> </ul>



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processes that incorporate information security considerations; (iii) employ software usage and installation restrictions; and (iv) ensure that third-party providers employ adequate security measures to protect information, applications, and/or services outsourced from the organization.	<p>employees. (SA-1)</p> <ul style="list-style-type: none"> <li>Agency performs and allocates capital resources for Security. (SA-2)</li> <li>Agency manages systems using SUITE. (SA-3)</li> <li>Agency includes security requirements in contracts. (SA-4)</li> <li>Agency adequately documents systems. (SA-5)</li> <li>Agency complies with software usage policies. (SA-6)</li> <li>Agency enforces policies governing software installation by users. (SA-7)</li> <li>Agency requires that external providers of systems employ adequate security controls. (SA-9)</li> </ul>	<p>security test and evaluation plans. (SA-11)</p>	
<p>System &amp; Communications Protection (SC)</p> <p>Organizations must: (i) monitor, control, and protect organizational communications (i.e., information transmitted or received by organizational information systems) at the external boundaries and key internal boundaries of the information systems; and (ii) employ architectural designs, software development techniques, and systems engineering principles that promote effective information security within organizational information systems.</p>	<ul style="list-style-type: none"> <li>A documented Systems and Communication Protection policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (SC-1)</li> <li>System protects against denial of service attacks. (SC-5)</li> <li>System monitors and controls communications at all boundaries. (SC-7)</li> <li>System protects the</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Agency separates user functionality from system management. (SC-2)</li> <li>System prevents unauthorized information transfer via shared systems. (SC-4)</li> <li>System protects the integrity of transmitted information. (SC-8)</li> <li>System protects the confidentiality of the transmitted information. (SC-9)</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p> <ul style="list-style-type: none"> <li>Agency separates security functions from non-security functions. (SC-3)</li> </ul>



NIST 800-53 Control Name	Security Classification		
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	integrity and availability of public information. (SC-14)	<ul style="list-style-type: none"> <li>● System terminates a network connection at end of session or inactivity timeout. (SC-10)</li> <li>● System prohibits remote activation of video or audio conferencing. (SC-15)</li> <li>● Agency utilizes public key certificates from an approved provider. (SC-17)</li> <li>● Agency restricts and manages mobile code technologies, ie. Java, ActiveX, Flash, ... (SC-18)</li> <li>● Agency restricts and manages voice over IP systems. (SC-19)</li> <li>● Agency restricts and manages fault tolerant Domain Name Systems (DNS). (SC-20) (SC-22)</li> <li>● System provides communication protection at the session level when session level protection is needed, ie. SOA, ... (SC-23)</li> </ul>	
System & Information Integrity (SI) Organizations must: (i) identify, report, and correct information and information system flaws in a timely manner; (ii) provide protection from malicious code at appropriate locations within organizational information systems; and (iii) monitor information system security alerts and	<ul style="list-style-type: none"> <li>● A documented Systems and Information Integrity policy that addresses purpose scope, roles, responsibilities, and procedures, developed and distributed to all employees. (SI-1)</li> <li>● Agency identifies, reports, and corrects information system flaws. (SI-2)</li> </ul>	<b>All Low plus the following:</b> <ul style="list-style-type: none"> <li>● Agency employs tools to monitor system attacks and unauthorized usage. (SI-4)</li> <li>● System has spam protection. (SI-8)</li> <li>● System restricts data input to authorized personnel only. (SI-9)</li> </ul>	<b>All Low and Moderate plus the following:</b> <ul style="list-style-type: none"> <li>● System verifies correct operation of security functions. (SI-6)</li> <li>● System detects and protects against unauthorized software and information changes. (SI-7)</li> </ul>



NIST 800-53 Control Name	Security Classification		
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advisories and take appropriate actions in response.	<ul style="list-style-type: none"> <li>Agency implements malicious code protection and techniques. (SI-3)</li> <li>Agency receives system security alerts and advisories and reissues them to appropriate personnel for action. (SI-5)</li> </ul>	<ul style="list-style-type: none"> <li>System checks information for accuracy, completeness, validity, and authenticity. (SI-10)</li> <li>System identifies and handles error without providing information that could be used for exploitation. (SI-11)</li> <li>Agency handles and retains outputs from systems in accordance with laws, orders, directives, and policies. (SI-12)</li> </ul>	
Vendor, contractor & third party	<ul style="list-style-type: none"> <li>Adherence to DTMB and Agency security policies</li> <li>Security Agreements signed, maintained and reviewed yearly</li> <li>Remote Access must be secured through the use of VPN, authentication, and access control lists</li> <li>Monitor and audit contractor activities</li> <li>Contractor software and equipment installed and configured to operate securely; virus protection and other SOM security procedures</li> <li>Eliminate physical and electronic access on the same day the contract ends</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>No self-assessment</li> <li>Required to implement controls that meet or exceed the State of Michigan’s established security controls.</li> <li>Must provide the State with identified or established vendor policies or a third party independent audit (e.g.: SAS70) and/or certification of their hosting facility to verify identified or established policies are in place to protect the State’s confidential and sensitive data.</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p>
Infrastructure/Network	<ul style="list-style-type: none"> <li>Virus protection mechanisms</li> </ul>	<p><b>All Low plus the following:</b></p> <ul style="list-style-type: none"> <li>Hosted in trusted environment</li> </ul>	<p><b>All Low and Moderate plus the following:</b></p> <ul style="list-style-type: none"> <li>Hosted in protected environment</li> </ul>



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	Low	Moderate	High
	<ul style="list-style-type: none"> <li>• Virus protection mechanisms updated whenever new releases are available</li> <li>• All publicly available host resources shall be placed in the DMZ</li> <li>• All servers must pass a vulnerability scan</li> <li>• Defined firewall rules prohibiting access and restricting traffic</li> </ul>	<ul style="list-style-type: none"> <li>• All servers must have standardized security logging enabled</li> </ul>	



## Appendix C – Acronyms

ACH	Automated Clearing House
CAC	Customer Assistance Center
CEPAS	Centralized Electronic Payment Authorization System
CI	Configuration Item
CMDB	Configuration Management Data Base
DLN	Driver’s License Number
DOB	Date of Birth
DMZ	DeMilitarized Zone
ECB	Enterprise Change Board
EFT	Electronic Funds Transfer
ESB	Enterprise Service Bus
ETRB	Executive Technical Review Board
FDGS	First Data Government Solutions
FEIN	Federal Employer Identification Number
FTP	File Transfer Protocol
HTML	HyperText Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICHAT	Internet Criminal History Access Tool
IMAC	Install, Move, Add, Change
J2EE	Java 2 Enterprise Edition
JSP	Java Server Pages
LCB	Local Change Board
MEDC	Michigan Economic Development Corporation
DTMB	Michigan Department of Technology, Management and Budget
MIME	Multipurpose Internet Mail Extensions
OneStop	MIBusinessOneStop
MCS	Michigan Office of Cyber Security
PC	Personal Computer
PDF	Portable Document Format
QA	Quality Assurance
RAID	Redundant Array of Independent Disks
RFC	Request for Change
RTN	Routing Transit Number
SAN	Storage Area Network
SBTCD	Small Business Technical Data Center
SEM	Systems Engineering Methodology
SMC	Service Management Center
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SoM	State of Michigan
SRDF	Symmetrix Remote Data Facility
SSL	Secure Socket Layer
SSN	Social Security Number
SSO	Single Sign-On
SUITE	State Unified Information Technology Environment
TDE	Transparent Data Encryption
TIM/TAM	Tivoli Identity Manager/Tivoli Access Manager
TCP/IP	Transmission Control Protocol/Internet Protocol
TRB	Technical Review Board
UAT	User Acceptance Testing
XML	Extensible Markup Language



## Appendix D - Laws, Regulations, DTMB and/or Agency Security Policies, Standards & Procedures

- Identity Theft Protection Act (Senate Bill No. 309), Public Act 566 of 2006, amending Act 452 of 2004 - *A person shall not obtain or possess personal identifying information of another person. If a security breach is determined, notification of the breach must be communicated in reasonable time. DTMB has published breach notification procedures*
- Social Security Number Privacy Act (Senate Bill No. 795, Public Act 454 of Public Acts 2004) - *A person shall not publicly display, use, or print all or more than 4 sequential digits of another persons SSN. Any use of SSN must use an encrypted manner and in accordance with the acts restrictions.*
- 1305 SOM Enterprise Information Technology Policy – *Generic policy which designates DTMB as the Agency to control technology and its implementation in a secure manner.*
- 1310.03 Active Directory Password Standard – *Requirements for length, complexity, age, and lockout for system passwords.*
- 1315.00 Policy for Storage of Sensitive Information on Mobile Devices & Portable Media – *All information classified as sensitive must be encrypted to be stored, transported, or written to any mobile device or media.*
- 1315.10 Standard for Electronic Data Encryption – *All information classified as sensitive must utilize minimum 128 bit encryption in storage (at rest) and 128 bit encryption in transmission over internal or external networks.*
- 1325 Information Technology Security Awareness Policy – *Designates that security awareness shall be performed and it is the responsibility of Agency Directors in conjunction with the State CISO to ensure delivery.*
- 1335 Information Technology Access Control Policy – *Requires systems to control Authentication, Authorization, and Accountability in order to provide for separation of duties and least privilege and documentation of system usage..*
- 1340 Information Technology Information Security Policy – *Due diligence must be performed in securing SOM information in respect to Confidentiality, Integrity, and Availability by all employees and trusted partners based on the classification of the information.*
- 1345 Information Technology Network and Infrastructure Policy – *It is the sole responsibility of DTMB to design and implement a technical infrastructure to deliver IT services for Agency business requirements.*
- 1350.11 Security Operational Guidelines for Servers – *General guidelines for installation, configuration, operation and maintenance of SOM servers including roles and responsibilities to minimize security risks.*
- 1350.20 Authorization Access to Data Sources – *Each user shall have a unique user Id.*
- 1350.40 Access Control Criteria for Data Sources – *Each user will be assigned a user Id based on least privilege and these Ids will be periodically reviewed and audited.*
- 1350.90 Secure Disposal of Installed & Removable Digital Media – *Identifies proper procedures and standards to be used to dispose of hardware which contains SOM information.*



- 1355 Project Management Methodology Policy – *DTMB and its client agencies are required to follow the Project Management Methodology for all IT-based initiatives.*
- 1360 Systems Engineering Methodology Policy – *DTMB and its client agencies are System Engineering Methodology for all new initiatives as well as enhancement and maintenance of existing systems.*
- 1390 Information Technology Continuity of Business Planning Policy – *Each Agency will ensure a Business Continuity Plan is developed and to identify and provide funding to support Disaster Recovery for essential critical business operations.*
- 1410.21 Procurement and Usage of State Wireless Devices – *Usage of PDAs, Blackberrys, phones, and pagers*
- 1420.00 Wireless – *Usage and deployment of wireless LANs and equipment.*



## **Appendix E - Security Analysis** *(To be completed by MCS Security Liaison)*

The Office of Cyber Security believes that the recommended additional controls listed in the analysis below, will additionally reduce the security risk to the public, maintain the SOM's business objectives to protect the public, and are relevant and responsive to the threats identified and therefore, strongly recommend that these controls be incorporated into your system in a deliberate and timely manner.

*The Office of Cyber Security makes no warranty that the threats/vulnerabilities or recommended controls identified in the Security Analysis are all inclusive.*



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Password sharing	<p>Persons could gain unauthorized access to sensitive information or system.</p> <p>Non-repudiation can no longer be achieved</p>			1350.20	<p>Security Awareness Training Program “MOST”</p>
Carelessly stored passwords	<p>Passwords could be stolen and used for unauthorized access to sensitive data or system</p>				<p>Store passwords encrypted</p> <p>Security Awareness Training Program</p>
Lose/forget password for network access or application	<p>Denial of Service for users.</p> <p>Unable to perform maintenance resulting in persons gaining unauthorized access to sensitive data or system.</p>				<p>Password locked in secure fireproof cabinet in secure location with only individual need-to-know access.</p> <p>Two or more security questions.</p> <p>Lock out after 5 invalid attempts</p>
Password effectiveness	<p>Passwords could easily be guessed and used for unauthorized access to sensitive data or system</p>				<p>Adherence to Michigan 1 password policy.</p> <p>Security Awareness Training Program</p>
Shoulder surfing	<p>Passwords could be obtained and used for unauthorized access to sensitive data or system.</p> <p>Sensitive data could be viewed by unauthorized individuals.</p>				<p>Passwords masked when displayed.</p> <p>Security Awareness Training Program</p>
Social engineering (i.e. phone, email, web site, in person)	<p>Hacker persuades staff to provide information that would enable them to gain access to SOM resources and sensitive data</p>				<p>Security Awareness Training Program</p>
Unauthorized access to sensitive/personal/confidential information	<p>Data is stolen resulting in identity theft.</p> <p>Financial Impact</p>				<p>Documented process for reviewing logs on a daily basis.</p> <p>Access Management process and procedures</p> <p>Security Agreements signed and maintained</p>



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Unauthorized modifications made to sensitive/personal/confidential information	Data is rendered useless.  Credibility damage, legal ramifications of falsification of data.				Documented process for reviewing logs on a daily basis.  Access Management process and procedures  Change Management Process and Procedures  Configuration management process and procedures  Separation of Duties  Least Privilege  Security Agreements signed and maintained.
Intercepted transmission of sensitive/personal/confidential information via Internet	Data is captured when transmitted via Internet resulting in unauthorized access of sensitive/personal/confidential data.				1315.10  Encrypt data end to end during transmission  Documented process for reviewing logs on a daily basis
Intercepted transmission of sensitive/personal/confidential information via LMAN	Data is captured when transmitted between web application and database resulting in unauthorized access of sensitive/personal/confidential data.				1315.10  Encryption to secure personal data at the application level  Documented process for reviewing logs on a daily basis.
Use of insecure protocols for transmission of sensitive/personal/confidential data	Penetration of system resulting in compromise of data.				1315.10  Encrypt data in database
Intentional or inadvertent exposure of sensitive / personal / confidential data to the internet or other inappropriate networks	Data is altered resulting in identity theft.  Violating State & Federal Laws  Fraud				1315.10  Database in secured zone  Data encrypted during session  Encrypt data in database



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Information leakage or inappropriate disclosure of sensitive/personal/confidential data	Identity Theft Fraud Legal ramifications				Security / Disclosure agreement signed and maintained.  Security Awareness Training Program
Installing unauthorized software	Could install a virus that will affect system and could spread to rest of network.  May be coded illegally, which could subject the agency to penalties.  Vulnerable to security flaws (not kept updated)  Could contain spy ware that will capture sensitive data to unauthorized users.				Software License validation  Security Awareness Training Program
Loss, or theft of, sensitive/personal/confidential data on mobile devices (i.e. USB drives, laptops, PDAs, etc.)	Mobile device being compromised and sensitive data obtained by unauthorized user(s).  Bad publicity, or damaging and costly litigation				1315.10
Not keeping operating systems, databases, and other software patched	Attacker could exploit vulnerabilities and take control of the system.				1350.11  Automated patch management process documented, tested, and followed.
Lack of Server Hardening	Unauthorized users may be able to obtain sensitive information about system resources, such as a list of all accounts or shared resources, registry permission settings, and make modifications to the registry				1350.11  Adherence to Michigan 1 password policy.



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Elevation of Privileges or Excessive Access Rights	Users having elevated privileges could obtain root privileges to sabotage system and gain access to sensitive/personal/confidential data				1350.40
Users leaving desktops unlocked while unattended	Individual impersonating the user logged in can read all assets residing on the client machine and travel over the network to gain access to sensitive information and SOM resources				1410.88 Adherence to Michigan 1 policy
Improper Separation of Duties	One individual having complete control of a process from start to finish leading to costly errors or fraud				1350.40
Lack of knowledge of vendor's security controls	Vendor capable of intentional/unintentional misuse of system without Agency knowledge				Documented security controls of vendor SAS70 from Vendor
Sensitive/personal/confidential data being stored without strong encryption	Unauthorized access to sensitive/personal/confidential data resulting in corruption or destruction of data				1315.10
Discarding of media that contains sensitive/personal/confidential data	Output containing sensitive/personal/confidential data improperly disposed of could lead to unauthorized access				1350.90
Lack of system/application/network logging	Malicious user gains unauthorized access to system and modifies data without being detected or misuses resources of the system/application/network				1350.11



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Easy-to-crack NetBIOS passwords being used on the network making it easy for hackers to traverse the network	Unauthorized users can launch brute force password attacks and other intrusive attacks to gain access to the network				Firewall Rules – specific ports identified  Documented Incident Response process and procedure
Malicious Attacks	Data could be rendered useless.  Data could be discreetly modified or deleted  Data could be inaccessible  Persons could gain unauthorized access to sensitive data.  Consume bandwidth causing systems to slow down or become unusable				Automated patch management process documented, tested, and followed.  Anti-Virus  Security Awareness Training Program  Access Control Policy  Quality Assurance Process  Change Management Process  Configuration Management Process  Code review walk-through
Buffer overflow	A malicious user can cause a breach in system security causing damage to data, modifications to data and disclosure of data				Quality Assurance Process  Code reviews performed to ensure that all parameters are validated.  Documented Change Control Process to ensure that appropriate security is maintained over application program code files.
Malicious Program Code	Malicious programs and code injected into application code in order to gain unauthorized access to sensitive data and resources				Quality Assurance Process  Code reviews performed to ensure that all parameters are validated.  Documented Change Control Process to ensure that appropriate security is maintained over application program code files.



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Denial of Service (DoS) caused by flooding with a large number of requests	<p>Malicious user can compromise the availability of the application and disable services.</p> <p>Crash or ungraceful degradation of the system</p>				<p>Firewall Rules – specific ports identified</p> <p>Utilized Intrusion Detection Software tools to continuously monitor servers.</p> <p>Load Balancing</p> <p>Documented Incident Response process and procedure</p>
Sniffing	Data packets are captured and decoded to collect information such as passwords or infrastructure configurations				<p>Firewall Rules – specific ports identified</p> <p>Utilized Intrusion Detection software tools to continuously monitor servers</p> <p>Documented Incident Response process and procedure</p>
Scanning	Penetration of system enabling an intruder to access the network’s unsecured ports				<p>Firewall Rules – specific ports identified</p> <p>Utilized Intrusion Detection software tools to continuously monitor servers</p> <p>Documented Incident Response process and procedure</p>
Spoofing	Compromise or destruction of state systems				<p>1350.11</p> <p>Firewall Rules – specific ports identified</p> <p>Application level security</p>
Wireless broadcasting of sensitive/personal/confidential data in an insecure manner	An attacker uses a wireless network to launch an attack and gains unauthorized access				1420.00
Wireless access point spoofing	An attacker uses a wireless network to launch an attack and gains unauthorized access				1420.00



Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Wireless systems using WEP or less security	An attacker uses a wireless network to launch an attack and gains unauthorized access				1420.00
Logs stored in insecure location	Malicious user modifies logs to 'cover their tracks'				Encrypt log data  Logs stored on other network devices (IE: SAN, NAS, etc.)
Logs store confidential data such as passwords	Malicious user accesses logs containing confidential data and sabotages network or gains unauthorized access to sensitive data  Legal exposure from security breaches and costly network downtime.				Encrypt log data  Documented process for reviewing logs on a daily basis.
Back doors to network (i.e. dial-in modems, wireless access points, etc.)	Unauthorized users can log into the system undetected, execute unauthorized commands and leave the system vulnerable to other unauthorized users.  Malicious users may use the system to access other systems and perform a coordinated DoS attack.				Firewall Rules – specific rules identified  Utilized Intrusion Detection Software tools to continuously monitor servers.  Document Incident Response process and procedure
Network devices and servers remotely administered with insecure protocols	Direct access to SOM resources resulting in intrusion or unauthorized access to personal data.				1410.21 1410.22 1410.24
Devices being connected to the network that may be infected with viruses (e.g. contractor laptops)	Unauthorized access to sensitive/ personal/ confidential data.  Port/segment blocking due to the spreading of a virus  System down time, lost productivity.				DIT-0155 Foreign Device Network Connection Request



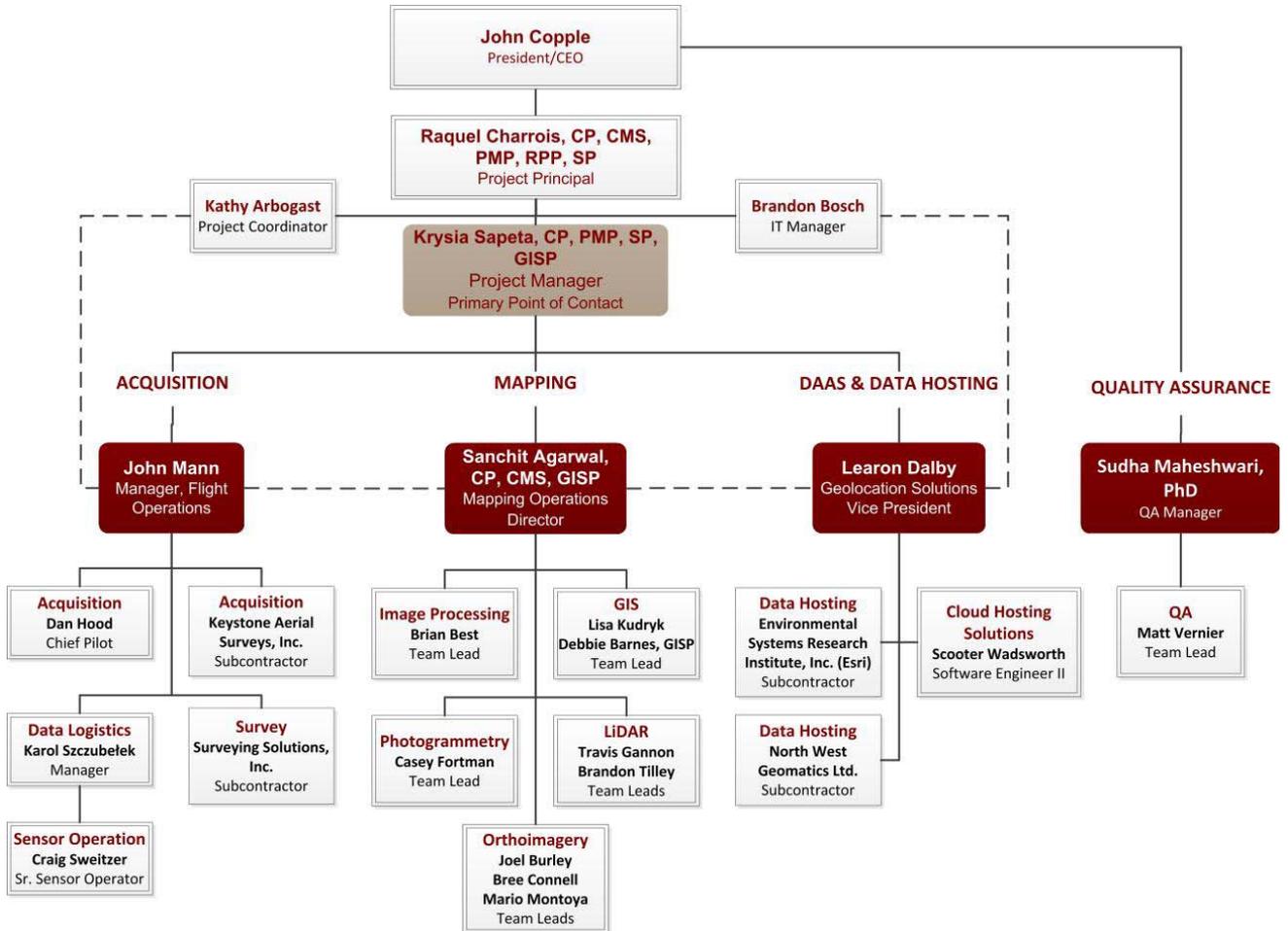
Threats / Vulnerabilities	Risks if a control is not implemented	Controls Currently Implemented in the Project (See Section 5.4/6.4)	Probability (H, M, L)*	Impact (H,M,L)*	Recommended Additional Controls
Remote users that may have infected computers, connecting to the network	Unauthorized access to sensitive/ personal/ confidential data.  Port/segment blocking due to the spreading of a virus  System down time, lost productivity.				DIT-0155 Foreign Device Network Connection Request
Physical damage to facility and/or equipment caused by storm, tornado, vandalism, accident, etc.	Information unavailable  Loss of service to public  System down time, lost productivity				Business Continuity Plan and disaster Recovery Plan documented, tested and implemented
Equipment failure/malfunction	Information unavailable  System down time, lost productivity				Business Continuity Plan and disaster Recovery Plan documented, tested and implemented.

\* - The Probability and Impact are based on the Agency's existing controls.



# Attachment H Contractor Org Chart and Personnel Resumes

## Part 1: Contractor Org Chart





## Part 2: Resume for Project Manager

<b>Proposed Resource Name:</b>	<b>Krysia Sapeta, CP, PMP, SP, GISP</b>
<b>Proposed Classification:</b>	<b>Project Manager</b>
<b>Key Personnel:</b>	<b>Yes</b>
<b>If resource is associated with a subcontractor provide name of company:</b>	<b>N/A</b>
<b>Percentage of time resource will be allocated to project:</b>	<b>20%</b>

\*Ms. Sapeta has managed more than 35 projects of varying size and complexity within the last 3 years. Below are particularly relevant references that showcase the skill and experience that qualifies Ms. Sapeta for the duties and responsibilities of the State of Michigan's project:

<b>Start Date:</b> November 2010	<b>End Date:</b> Ongoing
<b>Client/Project:</b> Gwinnett County, Georgia 75 Langley Drive, Lawrenceville, GA 30045 Sharon Stevenson, ITS Manager (770) 822-8033 Sharon.stevenson@gwinnettcountry.com	
<b>Employer:</b> The Sanborn Map Company, Inc.	
<b>Title/Percentage of time:</b> Project Manager, 15%	
<b>Description:</b> Gwinnett County is a longtime customer of Sanborn's and Ms. Sapeta managed the initial mapping of Gwinnett County in 1999. She is currently managing the 2nd year of the 5-year continuing contract. The scope of work includes the acquisition of new LiDAR and update of 2' contour data. Additionally, the impervious surface information is updated each year to an aggressive schedule of completion within 3 months of imagery acquisition. The remainder of the planimetric data is also performed, within a total timeframe of 9 months	

<b>Start Date:</b> December 2011	<b>End Date:</b> Ongoing
<b>Client/Project:</b> Kansas Information Technology Office 900 SW Jackson Street, Room 751-S, Topeka, KS 66612-1275 Ivan Weichert, Project Manager (785) 296-0257 ivan.weichert@da.state.ks.us	
<b>Employer:</b> The Sanborn Map Company, Inc.	
<b>Title/Percentage of time:</b> Project Manager, 20%	
<b>Description:</b> Beginning in December, 2011, Ms. Sapeta successfully completed LiDAR acquisition and processing for 10,000 square miles of LiDAR in the southwest portion of the State. The project was completed with 100% customer satisfaction, ahead of schedule. Deliverables included LAS, ESRI Grid bare earth, DSM, FGDC compliant metadata, Intensity images and various interim products and reports.	

<b>Start Date:</b> November 2003	<b>End Date:</b> April 2011
<b>Client/Project:</b> Pima Association of Government 177 North Church Ave., Suite 405 Tucson, AZ 85701 Manny Rosas, GIS Administrator (520) 792-1093	



<a href="mailto:MRosas@pagnet.org">MRosas@pagnet.org</a>
Employer: The Sanborn Map Company, Inc.
Title/Percentage of time: Project Manager, 15%
Description: The project entailed the acquisition of digital imagery via Sanborn's DMC multispectral sensor to simultaneously collect panchromatic, RGB, and near infrared imagery, and produce 4" and 12" pixel resolution orthoimagery. Sanborn acquired LiDAR in strategic areas to support digital terrain modeling. LiDAR was post processed and photogrammetrically enhanced with breaklines to support the production of digital orthoimagery and 2' contour mapping. The county covers approximately 2,000 square miles.

**EDUCATION**

Education		
Degree (i.e. PhD, Master's, Bachelors)	B.S.	Year Completed: 1982
Program	Geology	
University	Long Island University, Southampton, N.Y.	

**TRAINING**

Technical or Professional Training	
Course Name	Introduction to ArcGIS 1
Topic	
Date taken	2007

Technical or Professional Training	
Course Name	Project Management Professional Certification Training, Project Management Institute
Topic	
Date taken	2005

Technical or Professional Training	
Course Name	Leadership Training for Managers
Topic	
Date taken	2000

Technical or Professional Training	
Course Name	GIS Applications in Water, Wastewater, and Stormwater Systems
Topic	
Date taken	2000

Technical or Professional Training	
Course Name	Managing Projects in Organizations, ESI International
Topic	
Date taken	1999

Technical or Professional Training	
Course Name	Managing Quality in Projects, Project Management Institute
Topic	
Date taken	1998

Certifications/Affiliations	
Name	Certified Photogrammetrist, American Society for Photogrammetry & Remote Sensing (ASPRS)
Topic/Description	Certification No. 1156
Date completed	1998



<b>Certifications/Affiliations</b>	
<b>Name</b>	Certified Project Management Professional (PMP); Project Management Institute (PMI)
<b>Topic/Description</b>	Certification No. 74175
<b>Date completed</b>	2004

<b>Certifications/Affiliations</b>	
<b>Name</b>	Surveyor Photogrammetrist, Virginia
<b>Topic/Description</b>	No. 0408000055
<b>Date completed</b>	2009

<b>Certifications/Affiliations</b>	
<b>Name</b>	Member, Geological Society of America (GSA)
<b>Topic/Description</b>	
<b>Date completed</b>	1985–Present

<b>Certifications/Affiliations</b>	
<b>Name</b>	Certified Geographic Information Systems Professional (GISP)
<b>Topic/Description</b>	Certification No. 00064163
<b>Date completed</b>	2010





### Part 3: Resume for Certified Photogrammetrist

<b>Proposed Resource Name:</b>	<b>Raquel Charrois, CP, CMS, PMP, RPP, SP</b>
<b>Proposed Classification:</b>	<b>Project Principal</b>
<b>Key Personnel:</b>	<b>Yes</b>
<b>If resource is associated with a subcontractor provide name of company:</b>	<b>N/A</b>
<b>Percentage of time resource will be allocated to project:</b>	<b>5%</b>

\*Ms. Charrois has managed more than 45 projects, and been general manager for more than 150 more projects, all of varying size and complexity, within the last 3 years. Below are particularly relevant references that showcase the skills and experience that qualifies Ms. Charrois for the duties and responsibilities of the State of Michigan's project:

<b>Start Date:</b> October 2010	<b>End Date:</b> Ongoing
<b>Client/Project:</b> Virginia Geographic Information Network (VGIN) 11751 Meadowville Lane, Chester, VA 23836 John Scrivani (804) 416-6207 <a href="mailto:john.scrivani@vita.virginia.gov">john.scrivani@vita.virginia.gov</a>	
<b>Employer:</b> The Sanborn Map Company, Inc.	
<b>Title/Percentage of time:</b> Project Principal, 5%	
<b>Description:</b> Ms. Charrois serves as project principal, providing ongoing project oversight and guidance. With an emphasis on upfront planning, she works with acquisition, production, and the PMO to ensure that the project is on task financially and that all elements of the program are proceeding as planned.	

<b>Start Date:</b> October 2010	<b>End Date:</b> Ongoing
<b>Client/Project:</b> NYS DHSES - OCS - GIS 1220 Washington Avenue, State Office Campus, Building 7A Albany, NY 12242 Bill Johnson (518) 242-5200 <a href="mailto:WJohnson@dhses.ny.gov">WJohnson@dhses.ny.gov</a>	
<b>Employer:</b> The Sanborn Map Company, Inc.	
<b>Title/Percentage of time:</b> Project Principal, 5%	
<b>Description:</b> Ms. Charrois serves as project principal, providing ongoing project oversight and guidance. Ms. Charrois works to ensure that the needs of all the stake holders are met. Working with acquisition, production, and the PMO she works to ensure that the project is on task financially and that all elements of the program are proceeding as planned.	

<b>Start Date:</b> March 2011	<b>End Date:</b> Ongoing
<b>Client/Project:</b> Kansas Information Technology Office 900 SW Jackson Street, Room 751-S, Topeka, KS 66612-1275 Ivan Weichert, Project Manager (785) 296-0257 <a href="mailto:ivan.weichert@da.state.ks.us">ivan.weichert@da.state.ks.us</a>	
<b>Employer:</b> The Sanborn Map Company, Inc.	
<b>Title/Percentage of time:</b> Project Principal, 5%	
<b>Description:</b> Ms. Charrois serves as project principal, providing ongoing project oversight and guidance.	



Coordinating the many elements within the division Ms. Charrois works to she works to ensure that the project is a success.

**EDUCATION**

Education		
Degree (i.e. PhD, Master's, Bachelors)	Certificate	Year Completed: 2005
Program	Project Management	
University	Boston University, Boston, Mass.	

Additional Education		
Degree (i.e. PhD, Master's, Bachelors)	Associate's Degree	Year Completed: 2000
Program	Photogrammetry	
University	Granton Tech, Toronto, Ontario, Canada	

Additional Education		
Degree (i.e. PhD, Master's, Bachelors)	Associate's Degree	Year Completed: 1994
Program	Mathematics	
University	University of Northern BC, Prince George, B.C., Canada	

Additional Education		
Degree (i.e. PhD, Master's, Bachelors)	Associate's Degree	Year Completed: In Progress
Program	Mineralogy	
University	Granton Tech, Toronto, Ontario, Canada	

**TRAINING**

Technical or Professional Training	
Course Name	Introduction to Primavera P6 v7
Topic	
Date taken	2010

Technical or Professional Training	
Course Name	Introduction to Microsoft Project
Topic	
Date taken	2007

Technical or Professional Training	
Course Name	ArcGIS 101
Topic	
Date taken	2009

Technical or Professional Training	
Course Name	Program Management
Topic	
Date taken	2007

Technical or Professional Training	
Course Name	Risk Management
Topic	
Date taken	2007

Technical or Professional Training	
Course Name	PMP Preparation
Topic	



Date taken	2007
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<b>Technical or Professional Training</b>	
Course Name	Capstone
Topic	
Date taken	2007

<b>Certifications/Affiliations</b>	
Name	Project Management Professional (PMP), Project Management Institute (PMI)
Topic/Description	No. 290431
Date completed	2005 (re-certified 2009)

<b>Certifications/Affiliations</b>	
Name	Certified Photogrammetrist (CP), American Society for Photogrammetry and Remote Sensing (ASPRS)
Topic/Description	No. R1240
Date completed	2004 (re-certified 2009)

<b>Certifications/Affiliations</b>	
Name	Certified Mapping Scientist –Remote Sensing (CMS), ASPRS
Topic/Description	No. R152RS
Date completed	2006 (re-certified 2011)

<b>Certifications/Affiliations</b>	
Name	Certified Mapping Scientist (CMS) – GIS/LIS, ASPRS
Topic/Description	No. RGS186
Date completed	2006 (re-certified 2011)

<b>Certifications/Affiliations</b>	
Name	Registered Professional Photogrammetrist, <b>Oregon</b>
Topic/Description	No. 78700RPP
Date completed	2006

<b>Certifications/Affiliations</b>	
Name	Surveyor Photogrammetrist, <b>Virginia</b>
Topic/Description	No. 0408000069
Date completed	2009

<b>Certifications/Affiliations</b>	
Name	ASPRS Sub-Committee Chair, Certification Committee
Topic/Description	
Date completed	2009–Present



### Attachment I: Cost Table

<b>Table 1: IMAGERY PRICING, per Article 1.104, Section A and Attachment A</b> <b>12" GSD, 4-band, per square mile price based on the following TOTAL annual project square miles, AOIs defined by County boundaries. Detailed specifications in Attachment A - Imagery Specifications</b>			
Square Miles	Cost per sq. mile	% Reduction for 3-band	% Reduction for SOM provided GCPs
<4,000	\$52.51	1%	1%
4,000 - 5,999	\$48.49	1%	1%
6,000 - 7,999	\$44.09	1%	1%
8,000 - 10,000	\$42.49	1%	1%
>10,000	\$39.49	1%	1%
<b>% Reduction for contiguous AOIs (sq. miles)</b>			
Contiguous Square Miles	% Reduction		
1,000 – 2,500	0%		
2,501 – 5,000	16.00%		
>5,000	17.70%		
<b>6" GSD, 4-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment A - Imagery Specifications - Section 6.1</b>			
Square Miles	Cost per sq. mile	% Reduction for 3-band	% Reduction for SOM provided GCPs
10-100	\$151.44	1%	1%
101-500	\$94.08	1%	1%
>500	\$82.53	1%	1%



**3" GSD, 4-band, per square mile price based on the following High Resolution Areas (HRA) values. Detailed specifications in Attachment A - Imagery Specifications - Section 6.1**

Square Miles	Cost per sq. mile	% Reduction for 3-band	% Reduction for SOM provided GCPs
10-100	\$359.14	1%	1%
101-500	\$243.57	1%	1%
>500	\$226.87	1%	1%

**Updated DEM, per square mile price to be based on AOI. Detailed specifications in Attachment A - Imagery Specifications - Section 6.2**

AOI	Cost per sq. mile
Equal to AOI	Included in Ortho Prices

**Compressed Image Mosaics - price per County. Detailed specification in Attachment A - Imagery Specifications - Section 6.3**

Cost / County
\$400



<b>Table 2: LIDAR PRICING, per Article 1.104, Section B</b> <b>Base product collected using specifications defined in Sections 4, 5, and 6 of Attachment B - Lidar Specification and QL 2 accuracy specifications from Section 4.7 , per square mile</b>			
<b>Deliverable Option 1</b>			
<b>Raw Point Cloud - Calibrated-unclassified Section 7.2</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$248.17	132%	8%
101-500	\$129.31	160%	55%
501-1000	\$122.25	162%	55%
1001-5000	\$107.19	167%	55%
>5000	\$99.44	206%	64%
<b>Deliverable Option 2</b>			
<b>Classified Point Cloud - Section 7.3</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$30.03	107%	28%
101-500	\$27.02	108%	36%
501-1000	\$26.51	108%	36%
1001-5000	\$26.13	108%	36%
>5000	\$26.06	109%	36%
<b>Deliverable Option 3: Bare-Earth Surface - Section 7.4</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$13.97	0%	0%
101-500	\$13.97	0%	0%
501-1000	\$13.97	0%	0%
1001-5000	\$13.97	0%	0%
>5000	\$13.97	0%	0%



<b>Deliverable Option 4: Hydro-flattened Bare-Earth Surface, including Breaklines - Section 7.5</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$10.06	0%	0%
101-500	\$10.06	0%	0%
501-1000	\$10.06	0%	0%
1001-5000	\$10.06	0%	0%
>5000	\$10.06	0%	0%
<b>Deliverable Option 5</b>			
<b>Hydro-Enforced Digital Elevation Model (DEM) - Section 7.6</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	\$63.96	0%	0%
101-500	\$35.12	0%	0%
501-1000	\$29.25	0%	0%
1001-5000	\$29.25	0%	0%
>5000	\$29.25	0%	0%
<b>Deliverable Option 6</b>			
<b>Lidar Intensity Images - Section 7.7</b>			
square miles	Cost per sq. mile	% Increase for QL 1	% Reduction for QL 3
<100	0	0%	0%
101-500	0	0%	0%
501-1000	0	0%	0%
1001-5000	0	0%	0%
>5000	0	0%	0%



**Table 3: DATA AS A SERVICE PRICING, per Article 1.104, Section C**  
**Specifications as described in Attachment C.**

Option	Cost of 1,000 Gigabytes over 36 months
Base system specified in Attachment C - Section 1.4	
Optional system specified in Attachment C - Section 1.4.1	\$52,464.00