

## SECTION 504 COMPLIANCE REVIEW REPORT



### Museum of Science Boston, Massachusetts

Office of Diversity and Equal Opportunity

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## 1. Executive Summary

Section 504 of the Rehabilitation Act of 1973 prohibits discrimination against qualified individuals with disabilities by Federal fund recipients. Because NASA provides funding to the Museum of Science ("MOS") in Boston, MOS needs to take steps to provide equal opportunities for people with disabilities. NASA's review of MOS indicates that MOS is in substantial compliance with Section 504, but some additional steps are needed to augment compliance.

This report summarizes NASA's review of Section 504 compliance by MOS across a number of areas and makes the recommendations accordingly. NASA notes with approval the comprehensive efforts undertaken by MOS in response to NASA's recommendations in this report, as well as independently of NASA's review. <sup>1</sup>

NASA's recommendations are as follows:

- MOS should identify a Designated Responsible Employee ("DRE") to serve as a point person for coordinating overall program access at MOS. This DRE should work closely with an accessibility committee comprising different stakeholders throughout MOS who lead efforts that may affect access for people with disabilities.
- Grievance and complaint procedures within MOS need to be clearer and several tools (e.g. comment cards) can be used to gain better feedback from visitors with disabilities.
- Training at MOS can include more focused attention to the needs of visitors with disabilities and different strategies for providing accommodations. Because visitor interaction with MOS staff is often limited to the MOS front desk, MOS should pay particular attention to ensuring that information and resources available to front desk staff is particularly tuned for meeting the needs of users with disabilities.
- MOS should clarify the procedure for requesting sign language interpretation and should continue its efforts for making its website accessible.
- There are a number of architectural barriers within the MOS physical facility. Some of these barriers are in permanent locations, while others will likely be addressed during remodeling efforts. Nonetheless, all of these barriers should eventually be removed as part of MOS's transition efforts and ongoing self-evaluation of accessibility and overall program access.

The remainder of this report provides much more detailed information regarding each of these issues.

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<sup>1</sup> MOS documented these efforts in some detail in correspondence provided to NASA shortly before this report was finalized. See Stanley A. Howe, Jr., Grants Administrator/Sr. Acctg. Systems Coordinator, letter to Robert Cosgrove, External Programs Compliance Manager, Nov. 6, 2009 (hereafter cited as Howe Letter). This letter is attached as Appendix A. The report also includes information provided by MOS, as appropriate.

## 2. Background and Summary of Compliance Review

The Museum of Science (MOS) is one of our nation's oldest and foremost science museums. It was started in 1830 as the Boston Society of Natural History and the first physical structure was constructed as the New England Museum of Natural History in 1864. Construction of the current Museum of Science structure began in 1949 and was substantially enlarged to triple in size in the early 1970s. In the 1980s, the Mugar Omni Theater structure was added. From the early 1980s to the present, many other facilities within the MOS have been substantially renovated.<sup>2</sup>

NASA has provided a number of grants to MOS. Most recently, NASA provided a grant that expires on March 31, 2010, for a total of \$2,484,285.<sup>3</sup> MOS receives the largest share of its funding from the National Science Foundation.<sup>4</sup>

The following chronology summarizes the events relevant to developing this compliance review. This chronology also identifies many of the documents that are important for analyzing the MOS's compliance with Section 504.

November 21, 2007	NASA sent initial information requests to MOS.
May 16, 2008	MOS responded to information request, including a description of its programs and facilities and blueprints of several key facilities.
December 22, 2008	NASA sent follow-up information request to MOS.
January 16, 2009	MOS provided response to follow-up information request from NASA.
February 24-26, 2009	Site visit to MOS by NASA team. During this site visit, the team interviewed the MOS: <ul style="list-style-type: none"><li>• Chief Operating Officer (Wayne Bouchard)</li><li>• Vice President for Guest Services (Jonathan Burke)</li><li>• Manager for Research/Evaluation (Christine Reich)</li></ul>

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<sup>2</sup> Museum of Science, *Employee Manual*, pp. 8-9 (May 2008).

<sup>3</sup> This grant is described in NASA documents as award NNG04GH14A (Measuring Vegetation Health / Digital Earth Watch).

<sup>4</sup> Interview with Stanley Howe (Feb. 2009). The National Science Foundation has almost identical Section 504 requirements to the NASA regulations. 45 C.F.R. § 605. Because MOS will likely receive Federal financial assistance in the future and because almost all Federal agencies have similar Section 504 regulations, MOS has a strong incentive to ensure compliance with all aspects Section 504.

- Director of Facilities and Facilities Accessibility Coordinator (Paul Ippolito)
- Program Manager for Community Relations and Program Accessibility Coordinator (Maria Cabrera)
- Grants Administrator (Stanley Howe)

The team also performed an architectural survey of the main MOS where programs or services for the public are provided.

March 3, 2009

MOS provided a description of programmatic compliance issues.

August 12, 2009

Site visit by NASA and Section 504 expert architect. During this visit, NASA conducted a thorough review of architectural elements and confirmed deficiencies identified previously in the review.

Throughout this review, the MOS was cooperative and forthcoming with information. This reflects the overall impression of attentive customer service that NASA saw time and again during its visit to the facility.

### 3. Analysis

Section 504 prohibits discrimination on the basis of disability. Specifically, Section 504 requires that,

*No otherwise qualified individual with a disability ... shall, solely by reason of her or his disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance....*<sup>5</sup>

This requirement has been adopted by the NASA nondiscrimination regulations,<sup>6</sup> which itemizes specific prohibitions against forms of discriminatory conduct.

The following discussion divides the Museum’s response into four subsections where these regulations are applicable. Each subsection includes a summary of our review, a description of promising practices, and a listing of compliance issues and recommendations for additional changes for the Museum to pursue.

#### 3.1 Designation of Responsible Employee

The NASA Section 504 regulations make clear that fund recipients must designate a responsible employee and adopt grievance processes.

*(a) Designation of responsible employee. A recipient that employs 15 or more persons shall designate at least one person to coordinate its efforts to comply with this part.*

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<sup>5</sup> 29 U.S.C. § 794(a) (2008).

<sup>6</sup> 14 C.F.R. § 1251.103 (2008).

While Section 504 provides relatively little specific guidance for implementing this requirement, technical assistance materials developed for comparable requirements under Title IX of the Education Amendments of 1972 and Title II of the ADA provide additional assistance.

The Department of Justice and agency regulations under Title IX of the Education Amendments of 1972 include roughly similar requirements for a designated responsible employee and grievance procedures. Outside the formal regulatory process, the Department of Education has developed technical assistance material to further inform grant recipients of how to fulfill their Title IX obligations.<sup>7</sup> The Department of Justice has recommended fund recipients to abide by these recommendations<sup>8</sup> and has summarized the responsibilities and job requirements for the designated responsible employee. These responsibilities include,

- Providing consultation and information to potential complainants,
- Distributing and receiving grievance forms,
- Notifying parties, scheduling hearings, moderating procedures, monitoring compliance and timeliness, maintaining records, and training staff regarding grievance processes, and
- Providing ongoing training and technical assistance.

The core competencies of the designated responsible employee include,

- In-depth knowledge of Section 504 and general related knowledge of Federal and state non-discrimination laws,
- Knowledge of the recipient's grievance procedures and personnel policies/practices, and
- Ability to prepare reports on compliance activities, make recommendations to appropriate decision makers, diagnose and mediate differences of opinion.

According to the Department of Justice, for the designated employee to be effective,

- The functions and responsibilities of the designated employee must be clearly delineated and communicated to all levels of the entity, employees, and program participants, and
- The designated employee must be provided all information and authority and access necessary to enforce compliance requirements.

Because these requirements are not specifically included as part of the Section 504, they should be used as rough guidelines for Section 504 compliance and not as strict requirements.

Title II of the ADA closely mirrors the requirements of Section 504. Technical assistance material developed under Title II provides consistent guidance for choosing the central responsible employee (identified as the "ADA

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<sup>7</sup> Department of Education (Office of Civil Rights), *Title IX Grievance Procedures: An Introductory Manual* (2d ed. 1987), available at <http://www.eric.ed.gov/>.

<sup>8</sup> Department of Justice, *Questions and Answers Regarding Title IX Procedural Requirements*, available at <http://www.usdoj.gov/crt/cor/coord/TitleIXQandA.htm>.

Coordinator") within the organization.<sup>9</sup> While these ADA Title II resources are not as specific as the Title IX resources, above, they do add that an effective ADA Coordinator should have experience with disabilities and a familiarity with local disability organizations.

### 3.1.1. Findings of Fact

The Museum has designated its Director of Facilities as its Section 504 Facilities Accessibility Coordinator and its Community Relations Program Manager as its Section 504 Program Accessibility Coordinators. These steps are roughly consistent with the wording of NASA Section 504 regulation.<sup>10</sup>

MOS employees do not seem to be aware, however, of the roles that these individuals play in Section 504 coordination, which limits the effectiveness of the Section 504 Coordinators. For instance, the Section 504 Program Accessibility Coordinator's most important role within the organization is in the area of public relations; within MOS, she is neither considered an accessibility expert nor does she have her role as Section 504 Coordinator as part of her job description.<sup>11</sup>

After the inception of this review, MOS noted that it has created an Accessibility Team.<sup>12</sup> This committee includes the following key MOS personnel

- Wayne Bouchard, COO - Co-chair
- Britt O'Brien, VP Human Resources - Co-chair
- Paul Ippolito, Dir. Facilities - Facility Issues
- Maria Cabrera, Community Relations - Community Relations and Programs
- Andrea Durham, Dir. Exhibits - Exhibits and Programs
- Christine Reich, Mgr. Research/Evaluation - Universal Design Expert
- Stan Howe, Grants Administrator - Federal Regulations / Liaison

### 3.1.2 Compliance Analysis and Recommendations

As noted above, relatively little guidance exists for the designation of a responsible employee under Section 504. Because the Title IX recommendations described above have not been formally adopted into NASA's Section 504 regulations, these Title IX requirements serve as only guideposts in developing a Section 504 program. Based on these resources, MOS's current arrangement does not violate Section 504; MOS should consider, nonetheless, having one primary Section 504 Coordinator and ensure that this role is part of his/her job title and description. Doing so will augment compliance and streamline operations with respect to the needs of visitors with disabilities.

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<sup>9</sup> Department of Justice, *ADA Best Practices Tool Kit for State and Local Governments*, ch. 2 (available at <http://www.ada.gov/pccatoolkit/chap2toolkit.htm>); Adaptive Environments Center, *ADA Title II Action Guide* (1992)(reviewed and approved by the U.S. Department of Justice). The *ADA Title II Action Guide* is available upon request by contacting the Department of Justice ADA Technical Assistance Line at (800) 514-0301 (voice) or (800) 514-0383 (TTY).

<sup>10</sup> 14 C.F.R. § 1251.106-.107.

<sup>11</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>12</sup> Email from Stanley Howe to David Chambers (Aug. 18, 2009).



As this report makes clear, Section 504 compliance involves many moving parts. Section 504 compliance at MOS requires balancing such factors as customer service, exhibit design, and architectural improvements on a daily basis. One person within the organization needs to have the global view of how these different parts interoperate to ensure that program access is always maintained. This may require having “sub-coordinators” to address each of the specific areas; while these sub-coordinators may not report to the Section 504 Coordinator (and may even have a higher position within MOS), their work should be coordinated with the Section 504 Coordinator to the extent that accessibility for people with disabilities may be affected.<sup>13</sup> In many ways, the members of the newly-formed MOS Accessibility Team brings together the skill sets and areas of responsibilities to help coordinate different areas within MOS that need to be considered for Section 504 compliance.<sup>14</sup> Nevertheless, the NASA regulations envision that one individual have a lead responsibility for Section 504 compliance and have a more global “bird’s eye view” of the different moving parts that comprise Section 504 compliance.

As this report also makes clear, Section 504 compliance requires a detailed understanding of different laws and regulations that affect accessibility. One person within the organization should be intimately familiar with all aspects of Section 504 as part of their day-to-day job duties and should stay abreast of new developments and trends. It may also make sense for this person to understand MOS’s parallel obligations under the Americans with Disabilities Act and Massachusetts antidiscrimination laws for people with disabilities. Understanding the similarities and differences between these laws will help ensure that MOS is a model in accessibility practices under all sets of requirements.

Having a single Section 504 Coordinator will also improve MOS’s effectiveness. Having a single spokesperson and coordinator for Section 504 will:

1. make it easier for MOS to be proactive in meeting the future needs of people with disabilities;
2. give the Section 504 coordinator direct access to the Museum’s Chief Operations Officer, and the authority envisioned by Department of Justice regarding coordination of Section 504;
3. help MOS develop and articulate a clear vision and mission with regard to its visitors with disabilities—as well as the steps to getting there;
4. reduce confusion and improve MOS’s day-to-day operations with respect to visitors with disabilities.
5. have the Section 504 coordinator be regarded within the organization as the “go to person” for coordinating issues involving people with disabilities (e.g. provide effective communication for hearing impaired /deaf patrons or making reasonable modifications of policies for users with severe mobility impairments);
6. enable employees and program participants to respond more quickly to needs as they arise because they would have a central point-of-contact for addressing these needs; and,
7. reduce confusion and help ensure that employees and visitors have a clear understanding of their rights and responsibilities under Section 504.

### 3.2 Grievance Procedures

The NASA Section 504 regulations also require grantees to adopt adequate grievance processes.

*(b) Adoption of grievance procedures. A recipient that employs 15 or more persons shall adopt grievance procedures that incorporate appropriate due process standards and that provide for the prompt and equitable resolution of complaints alleging any action prohibited by this part.*

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<sup>13</sup> MOS has named a Section 504 Coordinator, consistent with NASA’s recommendation. See Howe Letter, pp. 2, 4.

<sup>14</sup> See Howe Letter, pp. 1-4 for a detailed description of the MOS Accessibility Committee, including its composition and formal roles and responsibilities.

*Such procedures need not to be established with respect to complaints from applicants for employment or from applicants for admission to postsecondary educational institutions.*

Again, while the Department's Section 504 regulations do not provide exacting details about the requirements for a grievance procedure, the Department's Title IX enforcement manual provides useful guidance. The Title IX manual states, "Title IX regulations do not specify a structure or format for the grievance procedures. Instead, each recipient must develop grievance procedures that most effectively provide for prompt and equitable resolution of complaints."<sup>15</sup> Again, the Department of Education Title IX technical assistance material provides useful benchmarks for an adequate grievance procedure.<sup>16</sup> This guidance recognizes that internal and external pressures may require institutions to adopt unique grievance procedures, but it does outline information required by the Department of Education Office of Civil Rights as a useful model that can be customized to an organization's specific needs:<sup>17</sup>

- the name, address, and signature of the complainant;
- a sufficient description of the alleged discrimination to let the organization know what occurred;
- the identity of the injured party;
- the name and address of the institution alleged to have discriminated;
- the approximate date(s) on which the alleged discrimination took place; and
- sufficient background information to permit the organization to commence an investigation.

### **3.2.1 Findings of Fact**

The Museum's primary vehicle for communicating to its visitors is "Your Visit Today", a brochure printed weekly that includes a floor map of the Museum and a schedule of daily shows, events, and presentations. This brochure includes general information about the grievance process and accessibility accommodations in place.<sup>18</sup>

MOS receives most of its visitor feedback through "comment cards." These comment cards are available at the front desk of the museum and the staff can also assist blind users by completing their comment cards.<sup>19</sup> NASA observed that there is a comment card box in the lobby just before the ticketing area and front desk. Some time ago, they received a complaint from a woman who had difficulty navigating portions of MOS with her mother who

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<sup>15</sup> *Questions and Answers Regarding Title IX Procedural Requirements*, available at <http://www.usdoj.gov/crt/cor/coord/TitleIXQandA.htm>.

<sup>16</sup> Department of Education (Office of Civil Rights), *Title IX Grievance Procedures: An Introductory Manual* (2d ed. 1987).

<sup>17</sup> *Id.* at p. 16.

<sup>18</sup> Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

<sup>19</sup> Interview with Stanley Howe (Feb. 2009); Interview with Maria Cabrera (Feb. 2009).

used a wheelchair. A concern was raised regarding the café and Butterfly Garden, where MOS has found that the contractors who work in this space occasionally impede accessibility through their placement of queuing stands and crowd-control ropes.<sup>20</sup> While MOS attempted to understand and resolve this complaint, the lack of contact information on the comment card made it impossible for MOS to contact the complainant.

The MOS Employee Handbook includes a notice of its non-discrimination policy.

A. *Americans with Disabilities Act (ADA)*

*The Americans with Disabilities Act (ADA) requires employers to reasonably accommodate qualified individuals with disabilities. It is the policy of the Museum of Science to comply with all Federal and state laws concerning the employment of persons with disabilities. It is the Museum of Science policy not to discriminate against qualified individuals with disabilities in regard to application procedures, hiring, advancement, discharge, compensation, training, or other terms, conditions, and privileges of employment. The Museum of Science will reasonably accommodate qualified individuals with a temporary or long-term disability so that they can perform the essential functions of a job. An individual who can be reasonably accommodated for a job, without undue hardship, will be given the same consideration for that position as any other applicant. All employees are required to comply with safety standards. Applicants who pose a direct threat to the health or safety of other individuals in the workplace, which threat cannot be eliminated by reasonable accommodation, will not be hired. Current employees who pose a direct threat to the health or safety of the other individuals in the workplace will be placed on appropriate leave until an organizational decision has been made in regard to the employee's immediate employment situation. The Human Resources Department is responsible for implementing this policy, including resolution of reasonable accommodation, safety, and undue hardship issues.<sup>21</sup>*

The handbook provides no additional guidance for employees filing or receiving complaints. Furthermore, this policy is only internal (i.e., intended for MOS employees) and consequently, does not mention the Section 504 obligations for MOS program and service participants (MOS visitors) that is delineated in NASA's Section 504 regulations.<sup>22</sup>

The MOS website includes a special page describing accommodations made for people with disabilities. It does not, however, include a form for requesting specific accommodations. It also does not include a form for complaints or comments.<sup>23</sup>

Once the comments are received (either electronically or in writing), they are keyed into a database system and reviewed with staff every two weeks.<sup>24</sup> All comments and complaints are also made available through the MOS's intranet.<sup>25</sup> According to MOS,

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<sup>20</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>21</sup> Museum of Science, Employee Manual, p. 11 (May 2008).

<sup>22</sup> 14 CFR § 1251.107.

<sup>23</sup> Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

*Upon receipt of a written complaint from a visitor regarding a disability issue, the complaint will be submitted to the appropriate department manager. The department manager will investigate and respond to the complainant with a decision in writing within ten business days of receipt of the complaint.*

*Once the informal resolution process has resulted in a decision, if the complainant is not satisfied, s/he may appeal the decision by writing... The President or his designee will review the original complaint, the letter outlining the decision and the appeal. The President or his designee will involve the appropriate Division Vice President in the investigation of the complaint and appeal. During this investigation process, the President, his designee or the Vice President may or may not contact the complainant directly for further information. At any time during the investigation process, the complainant may request a meeting with the President or his designee. All appeals will be addressed in writing within ten business days. Copies of this policy are made available to visitors at the Information Desk in the Museum's Main Lobby.<sup>26</sup>*

These procedures are not documented elsewhere.

MOS has recently started several innovative approaches for soliciting visitor feedback. MOS is beginning implementation of the Visitor Experience Monitoring Process, which will include having electronic surveys automatically sent via electronic mail to visitors.<sup>27</sup>

### **3.2.2 Compliance Analysis and Recommendations**

The Museum may wish to consider enhancing the front desk training/handbook materials to include some discussion on dealing with needs of MOS visitors with disabilities. One deficiency NASA observed during the course of its compliance review is that the Front Desk Handbook used to provide information to members of the public on a daily basis does not contain any specific guidance on dealing with visitors with disabilities.

The current "comment card" process should be revised so visitors can provide more useful information about their experience. In fact, MOS staff has noted that the comment card process is not optimal, e.g., the front desk staff could be better trained on helping people with disabilities make their needs known through the comment card process.<sup>28</sup> In addition, during our interviews with the MOS staff, it was noted that the comment card process could be communicated better to visitors, particularly users who are blind or visually impaired.<sup>29</sup> In order to better assist customers and provide follow-through on comments received, the Museum may wish to make minor adjustments to the comment cards, revising them slightly to more strongly encourage the provision of contact information, e.g., "please provide contact information so that we may better address your comment or concern" or similar, to better

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<sup>24</sup> Interview with Jonathan Burke (Feb. 2009).

<sup>22</sup> Interview with Stanley Howe (Feb. 2009).

<sup>26</sup> Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

<sup>27</sup> Interview with Jonathan Burke (Feb. 2009).

<sup>28</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>29</sup> Interview with Stanley Howe (Feb. 2009).

ensure prompt and effective customer service in regard to concerns relating to accessibility for individuals with disabilities.”<sup>30</sup>

In addition to improving the comment card process, MOS should take steps to clarify its grievance processes (both for employees and for members of the public) and should take additional steps to ensure that members of the public and employees can access and understand the MOS grievance process.<sup>31</sup> For instance, the process for filing and resolving the complaints (including their review biweekly) can be memorialized and published at a single URL on the MOS website. Then, the MOS employee training manual, visitor forms, and online ticketing process can all reference this URL for the MOS’s current feedback processes regarding accessibility. In addition, MOS should consider developing a comprehensive guide for visitors with disabilities that includes useful information (e.g. location of accessible restrooms and most accessible routes within the facility) as well as a description of MOS’s grievance process. Lastly, the MOS should revise its notice of non-discrimination policy to comport with 1251.107 (Notice), which provides that recipients perform the following: 1) notify program/service participants and beneficiaries of its Section 504 obligations; and 2) identify the DRE who serves 504 Coordinator (NASA also recommends that the DRE’s name, office address, office telephone number and office-email address be provided in this statement). MOS should add this statement (a truncated version is acceptable) to its website, as well as publications that contain general program information which are disseminated to MOS employees and program participants.<sup>32</sup>

### 3.2.3 Promising Practices

Participant feedback is one of the most important means of ensuring that program participants with disabilities are being afforded equal access to the goods and services of a program. At the same time, collecting candid and meaningful feedback can be a daunting task.

Online ticketing and the Internet provide an innovative tool for collecting better and more useful information from program participants. The Visitor Experience Monitoring Process being implemented by MOS may be a useful step in gathering information.

### 3.3 Eligibility Criteria, Education, and Awareness

Section 504 prohibits discrimination against qualified persons with disabilities. In general, this means that people who would otherwise be qualified to participate in a program cannot be discriminated against based on their disability. This obligation prohibits discrimination in the forms of segregation, denial of participation, discriminatory eligibility criteria, and other possible forms of discrimination. It also requires active steps to ensure equal participation by people with disabilities, such as making reasonable modifications of policies.

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<sup>30</sup> MOS has indicated that it intends to establish a “more official vehicle for registering complaints of discrimination that would serve to adequately capture the information required,” with reference to such a vehicle being included on the comment cards themselves, e.g., “If you have more specific concerns about accessibility than the space here allows, please visit us at <http://...>” See Howe Letter, p. 5.

<sup>31</sup> See fn. 30, above.

<sup>32</sup> See Howe Letter, pp. 5-7, for a detailed description of steps taken by MOS to address NASA’s recommendations regarding policy and complaint procedures, including dissemination of information and employee education and awareness efforts.

### 3.3.1 Findings of Fact

As a museum of science, the primary mission of the MOS is educating visitors about science. It does this primarily through its exhibits, but also through lectures, training, and tours conducted by its staff. The day-to-day impact that MOS has on its visitors with disabilities reduces to two fundamental areas: the design (an independent accessibility) of its exhibits and the training that its staff receives to ensure full program participation by people with disabilities. Both of these topics are discussed in the first two subsections.

In addition, there are a number of additional strategies that MOS has implemented to further improve program participation for visitors with disabilities. These additional strategies are discussed in the third subsection.<sup>33</sup>

#### 3.3.1.1 Exhibit Design

Starting in the late 1980s, MOS started to focus on exhibit designs to include a multi-sensory experience. This effort extended to include the older exhibits, many of which were never designed with accessibility in mind.<sup>34</sup> Since then, MOS has rapidly become a leader in the area of universal design for displays and computer interactive exhibits. At MOS, Christine Reich currently leads this effort and her focus is ensuring that exhibits fully incorporate universal design beyond just usability to ensure the exhibits are socially inclusive and facilitate learning from a variety of perspectives. MOS takes pride in its leadership in making exhibits accessible.

*We are seen by our peers in the Museum industry as a leader in addressing issues of access, having (for example) adapted some of our core exhibitry to provide multi-sensory experiences for all visitors over twenty years ago, and continuing to incorporate considerations of accessibility (physical, sensory, and cognitive) into the design of all the exhibits we have constructed since.<sup>35</sup>*

This assertion is supported by documents provided during the course of this investigation. During the course of this investigation, MOS provided a listing of 30 publications since 1990 (10 since 2007) focused on accessibility and universal design principles in the museum setting.<sup>36</sup> For instance, MOS developed universal design guidelines in 2007 under grant from the National Science Foundation. These guidelines included a strong focus beyond accessibility and examined how to ensure social inclusion and cognitive access.<sup>37</sup> MOS has led the field in conducting research studies focused on ensuring that deaf visitors benefit to the same extent as hearing visitors. For instance, they have experimented with handheld video tours and different learning modalities to more fully appreciate the cultural differences of "life in translation" and have developed best practices internally based on deaf user focus groups.<sup>38</sup> This work combined the efforts of MOS with the British-based Antenna Audio, which

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<sup>33</sup> See also Howe Letter, pp. 8-10.

<sup>34</sup> Interview with Christine Reich (Feb. 2009).

<sup>35</sup> Letter from Stanley Howe to David Chambers (May 16, 2008). See also, Christine Reich & Anna Lindgren-Streicher, *Conducting Evaluations with Persons with Disabilities* (PowerPoint Presentation for 2007 Visitor Studies Association Conference).

<sup>36</sup> Museum of Science, *Boston, Bibliography of Access-Related Materials* (Jan. 13, 2009).

<sup>37</sup> Christine Reich, *Universal Design Guidelines for Public Programs in Science Museums*.

<sup>38</sup> Elissa Chin and Christine Reich, *Lessons from the Museum of Science's First Multimedia Handheld Tour: The Star Wars: Where Science Meets Imagination Multimedia Tour* (Aug. 2006)(funded by the NIST); Elissa Chin and

focuses on audio interpretation technology for museums. Although the results were inconclusive (largely because, unlike art museums, science museum rely so heavily on interaction), it is valuable research and an incentive for additional research as handheld technologies improve. MOS has also conducted research focus groups involving users of various ages and with different disabilities to assess usefulness and interactivity of different methods of computer interactive exhibits.<sup>39</sup> MOS recognizes that museums need to go beyond ordinary accessibility rules because they are learning environments and because they have a high degree of control over how to design exhibits to facilitate learning.<sup>40</sup>

In addition to their leadership in research on universal design principles, MOS has also implemented many best practices in the design of their exhibits. Exhibit design considers how to be inclusive from a physical, cognitive, and social way and they have found that the best way to accomplish these goals is to ensure that displays are flexible and use several different modalities.<sup>41</sup> MOS has developed processes for considering how an exhibit creates opportunities and challenges for people with disabilities. MOS breaks this evaluation process down into different stages (e.g. formative, summative, etc.) that gives the museum standard ways of looking at the problem at different stages of an exhibit's development. Part of the MOS process also involves recruiting users with disabilities to help test and evaluate exhibit design and developing metrics around different approaches. This gives MOS the ability to wrap objective data around different accessibility choices. MOS reaches out to state and local disability commissions, ILC and ALCs, university disability centers and VSA (Very Special Arts) for advice on exhibit design.

In response to NASA's inquiries, MOS has provided several documents that demonstrate its leadership role in applying universal design concepts to museum exhibitions.<sup>42</sup> MOS also provided a complete checklist of universal design recommendations for creating interactive computer exhibits.<sup>43</sup>

### 3.3.1.2 Training

In response to this review, MOS provided a copy of the employee handbook that includes their policies regarding discrimination on the basis of disability.<sup>44</sup>

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Christine Reich, *"Life in Translation": Addressing Deaf Visitors in Museums with an American Sign Language (ASL) Multimedia Tour* (July 2006)(funded by the NIST).

<sup>39</sup> Christine Reich, *Universal Design for Computer Interactives for Science Museum Exhibitions* (presented at 2006 Annual Meeting of the National Association of Research in Science Teaching (NARST)).

<sup>40</sup> Christine Reich, *Universal Design Guidelines for Public Programs in Science Museums*.

<sup>41</sup> Christine Reich & Anna Lindgren-Streicher, *Conducting Evaluations with Persons with Disabilities* (PowerPoint Presentation for 2007 Visitor Studies Association Conference).

<sup>42</sup> Elissa Chin and Christine Reich, *"Life in Translation": Addressing Deaf Visitors in Museums with an American Sign Language (ASL) Multimedia Tour* (July 2006)(funded by the NIST); Christine Reich, *Universal Design of Interactives for Museum Exhibitions* (May 2005)(funded by the National Science Foundation); Christine Reich, *Universal Design For Computer Interactives For Science Museum Exhibitions* (presented at 2006 Annual Meeting of the National Association of Research in Science Teaching (NARST)); Christine Reich and Minda Borun, *Exhibit Accessibility And The Senior Visitor: Assessment Session Findings For Secrets Of Aging*.

<sup>43</sup> *Interactive Design Features That Promote Universal Design*.

While useful, this policy statement does not provide a thorough description of the training provided to the MOS staff. In correspondence with NASA, MOS provides some additional details. For instance, the pre-employment job application form identifies MOS's nondiscrimination policy. As part of the interview process, prospective employees are asked about how they would accommodate visitors with disabilities. MOS states, "In the recruiting process itself, the Museum's particular actions in communicating and implementing its policy and establishing an environment in which a qualified person with disabilities can successfully join the Museum's staff are situation-specific. For example, an applicant might be encouraged to explain how they might perform the specific functions of the job with/without reasonable accommodations."<sup>45</sup> MOS goes on to note that, "in the Museum's mandated new employee orientation, formally titled the Guest Service Program Workshop I, everyone is given a copy of the Employee Handbook, and an HR Representative reviews all critical policies. These new staff are also guided to refer to the Handbook on-line, to find all updated materials."<sup>46</sup>

During the on-site review, NASA had the opportunity to inquire more deeply into the training provided to the MOS staff. All staff (including contractors) have to go through two-day training session within their first year. This training includes situational training around working with people with disabilities.<sup>47</sup> It also includes an immersive experience that requires trainees to use a wheelchair and gain insight into the real-life experiences of people with disabilities.<sup>48</sup> Lecturers and presenters are not included-- only guest-facing staff. In addition, the MOS staff understands that there is a helpful new employee resource manual available to people working at the front desk.<sup>49</sup> At the same time, there is also recognition that additional training may be helpful—provided that managers encourage or require their staff to attend training.<sup>50</sup> In addition, the last training specific to the ADA's requirements was given at least eight years ago and most of MOS's staff generally focus only on mobility impairments when considering how to meet the needs of people with disabilities.<sup>51</sup> MOS staff is generally helpful, but they could be made better aware of how specific accommodations can be made (e.g. moveable seating in cafe, high shelves in store, etc).<sup>52</sup>

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<sup>44</sup> See Section 3.2.1, above, and letter from Stanley Howe to David Chambers (May 16, 2008).

<sup>45</sup> Letter from Stanley Howe to David Chambers (May 16, 2008).

<sup>46</sup> *Id.*

<sup>47</sup> Interview with Jonathan Burke (Feb. 2009).

<sup>48</sup> This two-day training has been recognized by Smithsonian Institution's staff as a promising practice. Interview with Wayne Bouchard (Feb. 2009).

<sup>49</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>50</sup> *Id.*; see also Interview with Jonathan Burke (Feb. 2009). Staff is encouraged to attend disability ad hoc disability discussions and trainings, but this is not a mandated requirement. Interview with Jonathan Burke (Feb. 2009). There is no specific training on Section 504 or responsibilities. Interview with Stanley Howe (Feb. 2009).

<sup>51</sup> Interview with Paul Ippolito (Feb. 2009).

<sup>52</sup> Interview with Maria Cabrera (Feb. 2009).



### 3.3.1.3 Additional Strategies for Ensuring Program Participation

MOS actively engages in outreach to the local disability community. For instance, MOS has worked with the Boston Area Retarded Citizens (BARC) to improve visitor experience for people with developmental disabilities.<sup>53</sup> In general, these groups interface with the public affairs section within MOS.

MOS is also progressive in other areas for improving accessibility for people with disabilities. For blind visitors, MOS provides braille maps of the constellations in its planetarium,<sup>54</sup> and they provide self-guided maps at the front desk that are geared to the needs of blind patrons.<sup>55</sup> MOS is also the only museum in the Boston area that loans out electric scooters (MOS has five), and they are in constant use throughout the day.<sup>56</sup>

### 3.3.2 Compliance Analysis and Recommendations

While the MOS two-day mandatory training sessions are an excellent first step, the MOS should consider mandatory refresher training specific to disabilities and should make specific resources available on the MOS intranet to help ensure that employees have ready access to the information that they need in order to provide accommodations as needed. To ensure that the refresher training is as effective as possible, it should include the following elements at a minimum:

- awareness training regarding interacting with people with disabilities,
- the different legal mandates (including Section 504 and the Americans with Disabilities Act) that cover the MOS,
- situation-based training for meeting the needs of different types of disabilities (e.g. blindness, deafness, mobility impairments, etc.), and
- clear delineation of points of contact within MOS and required processes for seeking additional accommodations (e.g. requesting a sign language interpreter for a deaf visitor or a guide for a user with a developmental disability)

Ideally, all of these resources should also be made available (and kept up-to-date) through the MOS Intranet to ensure both that the MOS's latest policies are readily available and that employees have the tools they need to refresh their recollection when quick decisions are required for meeting the needs of visitors with disabilities.

During the course of NASA's compliance review, MOS staff repeatedly made reference to the Front Desk Handbook, both as a training tool and as a reference for providing information on a daily basis that gives information to members of the public. NASA's review, however, found that it does not contain any specific guidance on dealing with visitors with disabilities. The MOS should also consider updating its Front Desk

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<sup>53</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>54</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>55</sup> Interview with Stanley Howe (Feb. 2009).

<sup>56</sup> Interview with Jonathan Burke (Feb. 2009).

Handbook to include references both to the refresher training and to the URL on the MOS intranet that can help ensure that employees understand how to best accommodate visitors with disabilities. The Museum may wish to consider, for example, enhancing the front desk training/handbook materials to specifically include some discussion on dealing with needs of MOS visitors with disabilities, such as the material from the refresher training and the website.

The Front Desk personnel serve a key role as the first interface with the public. Therefore, these individuals are in particular need of special training and resources. The disability-focused refresher training should include these personnel and the MOS should consider requiring this training before personnel can work at the front desk.<sup>57</sup>

MOS does a good job of public outreach to disability organizations, but it is unclear whether the valuable lessons learned trickle down to the staff. Additionally, other promising strategies (such as providing electric scooters) are important steps that need to be widely known within MOS. MOS has recently created an Accessibility Team that brings together stakeholders from different areas of MOS to share information and awareness of resources and knowledge may enable MOS to capture and share each other's best practices for meeting the needs of visitors with disabilities.<sup>58</sup>

### 3.3.3 Promising Practices

NASA's site visit revealed that the Museum does an exceptional job at meeting the needs of participants with disabilities in its exhibit design. MOS goes beyond the basic incorporation of Universal Design principles in its exhibits—instead, it considers the full cognitive and social impact of its designs. Also, by creating a seamless experience for all users, MOS's innovative staff creates a more enriching and thought-provoking experience for all users. NASA views MOS as a leader in this area.

## 3.4 Effective Communication

The NASA regulations provide that,

*Recipients shall take appropriate steps to ensure that no handicapped individual is denied the benefits of, excluded from participation in, or otherwise subjected to discrimination in any program or activity receiving Federal financial assistance because of the absence of auxiliary aids for individuals with impaired sensory, manual, or speaking skills.*<sup>59</sup>

This "effective communication" requirement means that Federal fund recipients must take steps to ensure that people with disabilities are not excluded based on disabilities that affect communication. This requirement may include providing sign language interpreters, transcripts, or braille or audio information.

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<sup>57</sup> See Howe Letter, pp. 7-8, for information detailing steps MOS has recently taken and plans to take to address the staff training needs.

<sup>58</sup> See Section 3.1. Prior to the formation of this committee, there was support within MOS for the formation of an Accessibility Team. Interview with Maria Cabrera (Feb. 2009).

<sup>59</sup> 14 C.F.R. § 1251.103(b)(3).

The term “auxiliary aids” is not specifically defined in the NASA Section 504 definitions.<sup>60</sup> The Department of Justice Section 504 regulations, which agency regulations must conform with, defines “auxiliary aid” as:

*Auxiliary aids means services or devices that enable persons with impaired sensory, manual, or speaking skills to have an equal opportunity to participate in, and enjoy the benefits of, programs or activities conducted by the agency. For example, auxiliary aids useful for persons with impaired vision include readers, Brailled materials, audio recordings, telecommunications devices and other similar services and devices. Auxiliary aids useful for persons with impaired hearing include telephone handset amplifiers, telephones compatible with hearing aids, telecommunication devices for deaf persons (TDD’s), interpreters, notetakers, written materials, and other similar services and devices.*<sup>61</sup>

### 3.4.1 Findings of Fact

MOS has no sign language interpreters on call and there are no formal agreements in place with sign language interpreting service providers in place—but MOS does retain interpreter services for events.<sup>62</sup> Typically sign language interpreters are provided several times a month and also real-time live captioning is provided by remote operators.

There are no specific policies or procedures for employees, but there is also no evidence that they have failed to provide interpreters when required. The Section 504 Coordinator understands that ASL interpreters generally require two weeks notice. In addition, while anyone at MOS can request an interpreter, that fact is probably not well known.<sup>63</sup> During interviews with the staff, MOS recognized that it could do a better job of providing notices to the public for the process of requesting a sign language interpreter.<sup>64</sup>

MOS experimented with having a "Deaf Day" or "ASL Day" when MOS would have lots of interpreters and make the experience as seamlessly inclusive as possible. The problem was that many times, the museum didn't have deaf patrons showing up. Also, when MOS sought feedback from the deaf community, it was told that usually ASL interpreted tours were not necessary.<sup>65</sup>

MOS has had good success with captioning. Many of its displays have captioning. In addition, the IMAX Omni theater uses rear-window captioning<sup>66</sup> for deaf patrons.

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<sup>60</sup> 14 C.F.R. § 1251.102.

<sup>61</sup> 28 C.F.R. § 39.103.

<sup>62</sup> Interview with Stanley Howe (Feb. 2009).

<sup>63</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>64</sup> Interview with Maria Cabrera (Feb. 2009).

<sup>65</sup> Interview with Christine Reich (Feb. 2009).

<sup>66</sup> Rear-window captioning provides captions along the rear of the theater wall. The visitor then uses a small rear-facing mirror that reflects the captions upwards. The advantage of this technology is that it does not visually interfere with the theater experience for other visitors. Rear-window captioning was developed by Boston-based

MOS has led the field in conducting research studies focused on ensuring that deaf visitors benefit to the same extent as hearing visitors. For instance, MOS has experimented with handheld video tours and different learning modalities to more fully appreciate the cultural differences of "life in translation" and have developed best practices internally based on deaf user focus groups. This work combined the efforts of MOS with the British-based Antenna Audio, which focuses on audio interpretation technology for museums. Although the results were inconclusive (largely because, unlike art museums, science museums rely so heavily on interaction), it is valuable research and an incentive for additional research as handheld technologies improve.<sup>67</sup>

According to MOS, relatively little information available in print format is currently made available to visitors in alternate formats—although MOS is currently in the process of making its most popular handouts available in braille upon request.<sup>68</sup> Additionally, the MOS technical staff has investigated the MOS public website and identified several potential areas where information cannot be effectively communicated to people with disabilities.<sup>69</sup> MOS has indicated that they are aware of this issue and hope to have it addressed shortly.

### 3.4.2 Compliance Analysis and Recommendations

Although there is no evidence of complaints by users who are deaf or who have hearing impairments, MOS should nonetheless consider developing and publicizing clear processes for visitors and employees to request sign language interpreters.

- **Information for Employees.** MOS employees should clearly understand the availability of and the process for requesting sign language interpreters when needed. Employees also need to understand the time delay in requesting an interpreter. This information would help them better meet the needs of deaf and hard of hearing visitors and should be part of the Employee Handbook and should be made available on the MOS intranet.
- **Information for Visitors.** MOS visitors also need to have a clear understanding of the process for requesting a sign language interpreter— and the time period in which a request must be made. This information should be included in general information for the public as well as every application or announcement of events where audio content will be an essential component.

As MOS acknowledges, the organization could do a better job at making printed material available to meet the needs of users with disabilities.<sup>70</sup> The current efforts at making braille material available on demand is an excellent

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WGBH, a leader in captioning technologies. Additional information about rear-window captioning is available at <http://ncam.wgbh.org/mopix/>.

<sup>67</sup> Elissa Chin and Christine Reich, *Lessons from the Museum of Science's First Multimedia Handheld Tour: The Star Wars: Where Science Meets Imagination Multimedia Tour* (Aug. 2006)(funded by the NIST); Elissa Chin and Christine Reich, *"Life in Translation": Addressing Deaf Visitors in Museums with an American Sign Language (ASL) Multimedia Tour* (July 2006)(funded by the NIST).

<sup>68</sup> Email from Stanley Howe to David Chambers (Aug. 16, 2009).

<sup>69</sup> Email from Stanley Howe to David Chambers (Sept. 4, 2009)

<sup>70</sup> See Howe letter, pp. 8-10, for steps MOS has taken and plans to take in regard to effective communication.

idea but less resource-intensive approaches may be more effective in meeting the needs of more users in the short term. For instance, many similar organizations provide “loaner copies” of handouts that can be checked out from the information desk. These copies are available in a variety of different formats (audio cassette, large print, and braille) and only a few of each format are needed in all but the most demanding circumstances. Creating an audio format is the simplest of all, as it only requires that a staff member read the contents of a brochure into a tape recorder. Other formats could be outsourced to organizations that specialize in creating alternate media.

MOS’s attention to the accessibility of its website content is well-deserved. Internet accessibility is an increasingly important topic and MOS is likely aware of developments like the NFB v. Target settlement (\$6 million settlement to class action brought by blind advocacy organization)<sup>71</sup> and the nationwide settlement in early September 2009 by the New York State Attorney General’s Office with HSBC Card Services, Inc. over its inaccessible website.<sup>72</sup> The HSBC settlement, in particular, follows the W3C’s Web Content Accessibility Guidelines (WCAG) 2.0 (level AA) just as MOS identified WCAG 2.0 as the measure of its accessibility. This standard is gaining increasing popularity worldwide as the de facto accessibility standard and MOS should continue these efforts.

### 3.4.3 Promising Practices

MOS has had great success with research on the needs of deaf and hard of hearing visitors in accessing exhibits within the museum. As technology improves, the usefulness of handheld technologies for eliminating barriers for people with disabilities will likely improve. Hopefully, MOS will continue to be a leader in this area.

### 3.5 Architectural Accessibility

The NASA Section 504 regulations distinguish between existing facilities and newly constructed or altered facilities. Newly constructed<sup>73</sup> and altered<sup>74</sup> facilities must be “readily accessible to and usable by” people with disabilities. In general, this means that such facilities and alterations must meet the stringent Uniform Federal Accessibility Standards (UFAS).<sup>75</sup>

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<sup>71</sup> See <http://www.nfbtargetlawsuit.com>.

<sup>72</sup> See [http://www.oag.state.ny.us/media\\_center/2009/sep/sep1a\\_09.html](http://www.oag.state.ny.us/media_center/2009/sep/sep1a_09.html).

<sup>73</sup> 14 C.F.R. § 1251.302(a) provides,

*Design and construction. Each facility or part of a facility constructed by, on behalf of, or for the use of a recipient shall be designed and constructed in such manner that the facility or part of the facility is readily accessible to and usable by handicapped persons, if the construction (ground breaking) was commenced after the effective date of this part.*

<sup>74</sup> 14 C.F.R. § 1251.302(b) provides,

*Alteration. Each facility or part of a facility which is altered by, on behalf of, or for the use of a recipient after the effective date of this part in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by handicapped persons.*

<sup>75</sup> 14 C.F.R. § 1251.302(c) provides,

By contrast, for existing facilities, NASA fund recipients must ensure that their programs or activities are readily accessible to persons with disabilities “when viewed in their entirety.”<sup>76</sup> This requirement does not mean that every physical feature of a facility must meet the UFAS standards.<sup>77</sup> Instead, the recipient may choose to redesign equipment, reassign services to accessible locations, or choose other methods that ensure accessibility for people with disabilities.<sup>78</sup> “In choosing among available methods for meeting the requirement of paragraph (a) of this section, a recipient shall give priority to those methods that offer programs and activities to handicapped persons in the most integrated setting appropriate.”<sup>79</sup> The UFAS standards generally provide a useful benchmark for those portions of a facility that are used for programs, services, or activities.

### 3.5.1 Findings of Fact

While the MOS strives to provide and maintain its buildings and facilities to be accessible to and useable by individuals with disabilities, a number of portions and elements of buildings/facilities do not meet the applicable accessibility standard. MOS has previously been found to have inaccessible portions of its facilities.<sup>80</sup>

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*Conformance with Uniform Federal Accessibility Standards. (1) Effective as of January 18, 1991, design, construction, or alteration of buildings in conformance with sections 3-8 of the Uniform Federal Accessibility Standards (USAF) (appendix A to 41 CFR subpart 101–19.6) shall be deemed to comply with the requirements of this section with respect to those buildings. Departures from particular technical and scoping requirements of UFAS by the use of other methods are permitted where substantially equivalent or greater access to and usability of the building is provided.*

*(2) For purposes of this section, section 4.1.6(1)(g) of UFAS shall be interpreted to exempt from the requirements of UFAS only mechanical rooms and other spaces that, because of their intended use, will not require accessibility to the public or beneficiaries or result in the employment or residence therein of persons with physical handicaps.*

*(3) This section does not require recipients to make building alterations that have little likelihood of being accomplished without removing or altering a load-bearing structural member. 14 C.F.R. § 1251.302(c). The UFAS requirements are available at 41 CFR subpart 101-19.6, App. A. Departures from particular technical and scoping requirements of UFAS by the use of other methods are permitted where substantially equivalent or greater access to and usability of the building is provided.*

<sup>76</sup> 14 C.F.R. § 1251.301.

<sup>77</sup> *Id.*

<sup>78</sup> *Id.* at § 1251.301(b).

<sup>79</sup> *Id.*

<sup>80</sup> MOS has provided NASA with a description of this finding.

*In July 1998, the Executive Director of the Cambridge (MA) Commission on Persons with Disabilities filed a formal complaint with the Architectural Access Board of the Commonwealth of Massachusetts, alleging that the entrance to the Museum’s Omni Theater was not accessible.... An initial hearing held on July 13, 1998 found in favor of the complainant and ordered the*

### 3.5.1.1 Methodology

When conducting Section 504 compliance reviews, NASA also conducts an accessibility assessment of the recipient's buildings and facilities that are accessible to and useable by its beneficiaries, including those with disabilities. In conducting such an assessment, NASA also reviews documents provided by the MOS that pertain to building accessibility. Accordingly, NASA conducted an on-site inspection of the MOS's buildings and facilities to determine whether the facility is accessible in accordance with the above-referenced regulations and standards. During the onsite, NASA had reviewed building elements (rooms, ramps, elevators, rest rooms, etc) for compliance with UFAS. The on-site portion of the review was conducted by NASA staff at the MOS on February 24-26, 2009, using UFAS. Instruments such as a digital level, measuring tape and portable luggage scale (to measure door opening pressure) were used in the on-site assessment using UFAS checklists for each element. The data collected on these checklists were then developed into an Excel spreadsheet where complaint and non-compliant elements of portions of MOS buildings can be extracted. Our findings are summarized by building element below and charts (by element, divided further by location) are provided in the appendix. It is noted that many portions of the facility were constructed before the standards went into effect and have not been altered or renovated since.

In addition, in 2009, NASA performed an accessibility review specific to the UFAS requirements and verified the contents of this report.

### 3.5.1.2 Facility Overview and Previous Accessibility Reviews

NASA's review found that the MOS consists of three Exhibit floors known from top to bottom as Level 2, Level 1 and Lower Level (basement). These Exhibit floors are further divided from left to right (looking at an MOS map) as Green and Blue (Level 2 and Lower Level) and Red, Green and Blue (Level 1).

The Museum also has the administrative "Tower" that has seven floors and holds offices and meeting rooms and other facilities for MOS staff and are not accessible to Exhibit Floor visitors. The Tower does have several meeting rooms (D'Arbeloff Suite, Hornblower Conference Room, Skyline Conference Room, and Hodgkinson Conference Room) that may be accessible to visiting individuals and groups who reserve in advance to hold meetings, training and other events. Access to each floor is provided by a series of elevators. Some floors have transitions to higher levels that require stairs and ramps.

In the late summer and fall of 2006, MOS worked with an organization known as VFA to conduct an evaluation of accessibility issues in the MOS facilities. According to MOS, this review was not conducted in response to a complaint, but was undertaken to quantify the "deferred maintenance" necessary for the facility<sup>81</sup> and to baseline

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*Museum to submit a plan for compliance. The Museum submitted such a plan on August 17, 1998, outlining operational changes to be implemented to remedy the particulars of the complaint, including improved staffing, training and monitoring of staff, and better communication. The physical space itself was averred to be compliant as designed and built. The Board reviewed the Museum's plan and on August 24, 1998 and voted unanimously that no violation existed and that the Omni Theater was in compliance with applicable regulations.*

Letter from Stanley Howe to David Chambers (May 16, 2008).

<sup>81</sup> Interview with Wayne Bouchard (Feb. 2009).

accessibility issues and associated costs.<sup>82</sup> According to MOS, VFA is currently used to inform much of their accessibility efforts

*The final product of the [the VFA] analysis was a comprehensive, updateable database of the Museum facility designed to enable ongoing analysis, evaluation, and maintenance and to maintain a record of these actions. The resulting report/database fills several large binders when printed, including much material extraneous to NASA's Section 504 inquiry. The full report is therefore not included here. However, the searchability of the database allows the Museum to easily excerpt the NASA-relevant portions<sup>83</sup>.*

For purposes of ensuring conformance with Section 504, the VFA report is of very limited value. First, MOS has provided NASA with only a small portion of the VFA data. In correspondence with NASA, MOS described some of the barriers only in several portions of the facility that receive federal funding. VFA report provided to NASA only covers specific rooms used for meetings and training events that are located in the "Tower" portion of the facility<sup>84</sup> and the Cahners Theatre<sup>85</sup> and very limited information about barriers in the three exhibit floors. In addition, MOS has provided NASA with excerpts of the report, which identify only a few additional barriers.<sup>86</sup> Second, the VFA assessment was conducted by evaluating the physical elements of these rooms with the ADA Accessibility Guidelines (ADAAG) and not UFAS. While ADAAG is a newer set of standards, it does not provide as useful a benchmark for assessing program accessibility.

### 3.5.1.3 MOS Accessibility Improvement Process and Budgeting

During the on-site interviews, NASA was able to gather additional information about the process and budgeting for eliminating barriers to ensure program accessibility. According to MOS, there is no specific budget or timeline set-

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<sup>82</sup> Interview with Paul Ippolito (Feb. 2009).

<sup>83</sup> Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

<sup>84</sup> Specifically, in correspondence from MOS to NASA, MOS noted that VFA found barriers in the D'Arbeloff Suite, Hornblower Room, Skyline Room, First Floor Conference Room, Hodgkinson Room; that the existing fire alarm system did not provide accessibility for deaf or hard of hearing individuals, several electrical outlets were at the wrong height; wall-mounted signage did not conform to ADAAG; and, that one room did not provide sufficient floor clearance near a door. Only two of these rooms (D'Arbeloff Suite and Skyline Room) were constructed or altered after the enactment of NASA's Section 504 regulations. Also, the Gordon Wing Classroom was constructed in 2007 (after the VFA review) and was not evaluated by VFA. Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

<sup>85</sup> Specifically, MOS noted that VFA had found that the Cahners Theatre did not provide the following ADAAG-compliant elements: fire alarm system, signage, or an assistive listening system. Letter from Stanley Howe to Miguel Torres (Jan. 16, 2009).

<sup>86</sup> VFA, *Requirement Detail Report* (2007-2008). Barriers identified by the VFA report include various devices outside allowable reach ranges in the east wing, planetarium, and other areas of the facility. In addition, the VFA report noted accessibility issues in doorways, employee work areas. The VFA report also noted a lack of assistive listening systems in areas with fixed seating for 50 or more attendees. The VFA report also identified a protruding object (exposed stair stringer) in the Theatre of Electricity and other locations in the facility.



aside for accessibility requirements.<sup>87</sup> Instead, recommended accessibility changes incorporated as other renovations are undertaken<sup>88</sup> and even small issues, such as signage, are not addressed unless part of a larger renovation project.<sup>89</sup>

Additionally, while the result of the VFA review was a “comprehensive, updateable database,” no specific updates based on 2006 VFA review are available.<sup>90</sup> In general, this means that there is no specific tracking of corrections and improvements.<sup>91</sup>

### 3.5.2 Compliance Analysis

The following section describes MOS areas that do not conform to the UFAS requirements.<sup>92</sup> Recommendations for correcting these deficiencies are considered in 3.5.3 *Compliance Recommendations*.

#### 3.5.2.1 Current Facilities

During the site visits to the MOS, NASA identified a number of areas that did not comply with the UFAS requirements. Because the MOS has had an ongoing program to upgrade and maintain its facilities throughout the different periods in which it received funding from Federal agencies (including NASA), it may be difficult or impossible to determine which barriers violated NASA's strict Section 504 requirements for alterations. Additionally, many of these barriers are in very public areas of the MOS where there are often significant crowds or where the functionality of the space varies (e.g. presentations, exhibit space, etc.). Therefore, NASA's review of the MOS was based on a close examination of the areas using the UFAS requirements as our standard.

The following analysis is broken down into different subsections and considers each area of the facility with respect to the UFAS requirements. In general, the subsections fall into one of two categories:

- **Rooms and Assembly Areas.** Because MOS is a science museum, the exhibit areas, meeting rooms, and assembly areas are critical elements because visitors come to MOS in order to use these portions of the facility. Because these elements are critical to program access under Section 504 and because MOS will likely want to address these issues on an area-by-area basis, they are addressed separately.
- **Other Elements.** Other elements within MOS provide critical support to these program areas and most need to conform to the UFAS requirements to the same extent critical program areas (such as rooms and assembly areas). For instance, there is little point to ensuring that an exhibit room fully meets the UFAS requirements if a person with the disability cannot get to the room. Also, because equal enjoyment and use of a program area also requires that persons with disabilities have the same level of access to

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<sup>87</sup> Interview with Wayne Bouchard (Feb. 2009); Interview with Stanley Howe (Feb. 2009).

<sup>88</sup> Interview with Wayne Bouchard (Feb. 2009).

<sup>89</sup> Interview with Paul Ippolito (Feb. 2009).

<sup>90</sup> Interview with Wayne Bouchard (Feb. 2009).

<sup>91</sup> Interview with Paul Ippolito (Feb. 2009).

<sup>92</sup> See also Howe Letter, pp. 9-11, on efforts MOS has taken or plans to take to address architectural accessibility.

convenience, hygiene, and safety requirements as persons without disabilities, all elements that affect the usability of program areas need to be considered. Because these barriers are often scattered throughout MOS facility, they are organized on a standard-by-standard basis.

#### 3.5.2.1.1 Rooms (Exhibit Areas and Meeting Rooms) (Various UFAS Standards)

NASA's onsite review evaluated the accessibility of exhibit areas and meeting rooms.

##### UFAS Non-Conformant Elements

In the meeting rooms and classrooms, the on-site review confirmed the deficiencies noted in the 2006 VFA report.

1. Electric receptacles were located lower than 15" from the floor
2. Thermostats that were mounted above the maximum of 54"

In two of the "Tower" meeting rooms (Hornblower and D'Arbeloff), NASA found additional deficiencies as follow:

1. Some of the table placements did not allow for a 30"x 48" clear floor space that adjoins an accessible route as per UFAS standard 4.32.2 and 4.2.4.
2. Both of these rooms also had tables that did not allow for a minimum of 27" height knee space underneath (UFAS Standard 4.32.3).
3. In the Hornblower Room, the two double leaf doorways do not comply with UFAS 4.13.4, which by reference, requires at least 32" of clear space for one leaf - they allow only 29 1/2" clear passage width.

The Skyline Meeting room had the following access deficiencies:

1. The wall mounted public phone is out of reach of wheelchair users at 62" high in violation of 4.31.3.
2. The bronze plaque that identifies this room is not positioned as specified in UFAS 4.30.6 and does not have the proper tactile characters required by UFAS 4.30.4.

The Hodgkinson Conference Room had the following access deficiencies:

1. The interior side of the bronze entry door threshold to this conference room used by the public periodically has a 1/2" overall height and no beveled transition as required by UFAS 4.13.8

In the Gordon classroom (renovated in 2007), NASA found various countertops and sinks that did not comply with UFAS:

1. Sink counter height exceeded the maximum height of 34" for work surfaces (4.32.4) at 34 1/2" and the screening apron under the two adjacent sinks does not allow the minimum knee space per UFAS 4.24.2 with only 2" depth at the top of the screening board.

With respect to exhibit floors, the review team found three recurring barriers:

1. Exhibit tables (which may include a seat as shown in Figure 1, below) did not comply with UFAS 4.32.
2. Several such exhibits have underneath knee space less than 27" high or 19" deep (in a number of cases, NASA found some tables to be 17" deep as in Figure 1, below).
3. A large number of exhibit tables, interactive kiosks and other protruding objects in exhibit areas project further than 4" into a circulation route between 27"-80" in violation of UFAS 4.4.

There were a number of individual (non-recurring) accessibility barriers found in the exhibition spaces, such as:

1. The 4.3% sloping glass bridge between the balcony along the Atrium area of the Level 1 Blue Wing and the Gordon Current Science & Technology Center stage is the only accessible route to the stage and it appears that the glass floor is cracked and unsafe to traverse making the stage inaccessible per UFAS 4.5.2.
2. In the *Investigate!* Exhibit on Level 2 of the Blue Wing the raised "archeology dig" area (approx. 6" step up) where visitors dig up items from the gravel pit has no ramp or other means of allowing wheelchair users to participate in the dig exhibit like other visitors can - this is in violation of UFAS 4.5.2.
3. At each corner of the wood topped glass guardrail along the Blue Wing Atrium on Level 1 and Level 2, the wood railing cap corner projects 8" into the circulation route with the leading edge (at 41") high than 27" and is not cane detectable as required by UFAS 4.4.1.
4. The new "Design Around Us" Resource Center in the Natural Mysteries Exhibit on the Lower Level Blue Wing has an emergency exit door with a book case adjacent that limits (at only 3") the minimum UFAS 4.13.6 required 12" push side, latch side door maneuvering space for this door with a latch and closer.
5. The oval shaped video presentation kiosk on Level 2 - Green Wing in the Birth Exhibit does not include an accessible 33" wide wheelchair seating space (only 29 1/2" provided) next to the existing benches in violation of UFAS 4.33.2.
6. The table in the River View Reading Room in the Human Evolution Exhibit on Level 2 - Green Wing is situated only 34" from the adjacent book shelves failing to provide the 36" wide accessible approach route to those book shelves required by UFAS 4.3.3.
7. In the Lower Level Atrium area there is a blue metal interactive bird flight exhibit with a pair of steep (11.0% and 12.0%) ramps along the floor section which have a 1/2" high edge treatment at the bottom of the ramps that are beveled steeper than the maximum allowable 1:2 slope per UFAS 4.8.2 & 4.5.2.

Additionally, in this Atrium area the underside of the monumental spiral stair leading down from the Main Entry Lobby is exposed with only pot plants spaced 24" apart beneath to act as cane detectable cues in violation of UFAS 4.4.2.

1. The wood floor of the Tin Roofed "Rock Collecting" exhibit in the Discovery Center on Level 1 - Red Wing does not have a beveled edge treatment as required by UFAS 4.5.2. Also in the Discovery Center, there is a raised platform (approx. 8" above the floor) housing a table and chairs near the window wall that does not provide an accessible approach route for wheelchair users per UFAS 4.5.2.



**Figure 1. Exhibit Table in the Natural Mysteries room (Blue Wing – Lower Level)**

The Museum leases to the public the Wedding Pavilion (big white tent) behind the Red Wing and in the park grounds next to the Charles River. There are also picnic tables located in the grass that are available to the public near the rear door used to approach this Wedding Pavilion. The customary process is to have guests arrive at the Museum main entry and proceed to the Red Wing elevator, which is taken to the ground level (near Hornblower Room) and out the back door, down a plywood ramp to the concrete sidewalk that leads to the tent. The following accessibility deficiencies were found in this area.

1. The threshold at the back door used to approach the Wedding Pavilion has a 1" overall height on the interior side with a 1/2" stone lip that is beveled steeper (at 1:1 slope) than the maximum allowable 1:2 slope, and the exterior side is also higher than the maximum 1/2" height (at 5/8" high) specified by UFAS 4.13.8.
2. Just beyond the end of the plywood ramp where the concrete approach walk intersects the back porch of the Museum, there is an abrupt level change (at 5/8") greater than 1/2" without the required ramp features per UFAS 4.5.2.
3. The picnic tables are not located on an accessible route because they rest in the grass, and there is no picnic table with the required knee space under the end or side as required by UFAS 4.5.1 & 4.32 respectively.
4. There is no curb ramp at the pedestrian approach walk from the adjoining driveway loading zone at the cul-de-sac as required by UFAS 4.5.2.
5. There are three Wedding Pavilion entry doors - the West end door nearest the Museum ramp has only steps leading up to the raised porch; the western most door on the south face of the pavilion has a plywood ramp that leads to an inaccessible gravel approach walk; and the eastern most door on the south face of the pavilion leads directly to the permanent park pavilion with a plywood ramp that has a 1" high

lip at the bottom, inaccessible handrails on each side, and no top landing at the pull side door maneuvering space - See UFAS 4.5.2, 4.5.1, 4.5.2, 4.8.5, 4.8.4 and 4.13.6.

6. The 1 1/4" high wood dance floor system has aluminum ramps on the edges that are steeper (at 25%) than the maximum allowable 8.3% per UFAS 4.5.2.
7. The 10 support posts of the tent structure have angled brackets at the top that limit head height along the perimeter of the enclosed Wedding Pavilion tent to less than 80" high in violation of UFAS 4.4.2.
8. On the upper level of the Museum Parking Deck is a small Observatory that is open to the public through special programs offered by the Museum. This Observatory is inaccessible because it is situated up two steps above the surface of the parking deck's 5th Level without an accessible ramp as required by UFAS 4.5.2.

The Duck Tour Booth in the Red Wing Atrium has the following accessibility issues:

1. The lowered counter portion used for disabled customers should remain open during business hours and during our on site visit, there was a sign at this lowered counter that read "position closed". Additionally, this lowered portion of the service counter was cluttered with brochures and other items making it difficult to use when needed to serve a wheelchair user.
2. The upper level and lower level service counters at the Duck Tour booth project further than 4" into the circulation route between 27"-80" in violation of UFAS 4.4.1.<sup>93</sup>

#### 3.5.2.1.2 Assembly Areas (UFAS 4.33)

The MOS has several assembly areas where live or video presentations are held. These include the Shapiro Live Science Area (Green Wing – Lower Level), Omni Theater (Red Wing – Level 1), Planetarium (Red Wing – Level 1), Cahners Theater (Blue Wing – Level 2), the Theater of Electricity (Blue Wing – Level 1), and Wright Theater (Blue Wing – Level 2). The Omni Theater is an IMAX-type theater, which has a steep grade for audience seating. The Cahners Theater, Theater of Electricity, and Shapiro Live Science Area are both often used for live presentations. The MOS informed us that the Planetarium will be completely renovated in the next two years.

MOS staff advised us of the following, with respect to total and accessible seating capacity:

Cahner's Theater	Total fixed seating for the theater - 292 Seating for wheelchairs – 3, with all aisle seats having no armrests for easy transfer for crutch users to regular seat.
Omni Theater	Total fixed seating for the theater - 314 Seating for wheelchairs – 6, with all aisles have armrests that move up for transfer for crutch users to regular seat.

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<sup>93</sup> Although MOS does not operate the Duck Tours (and are not part of MOS's programs, services, or activities), MOS does provide "significant assistance" to the Duck Tours by allowing the Duck Tours to use these portions of its facilities. 14 C.F.R. 1251.103(b)(v). Because these elements are inaccessible, the Duck Tours include barriers for people with disabilities. MOS needs to remove these barriers to ensure that it is not providing assistance to potential discrimination.

Planetarium	Total fixed seating for the theater - 239, 6 of which have armrests that move up for transfer for crutch users to regular seat. Seating for wheelchairs - 5, with advance notice 18 seats can be removed
Wright Theater	Total fixed seating for the theater -115 Seating for wheelchairs – 2, with 10 aisle seats having no armrests for east transfer for crutch users to regular seat.

#### UFAS Non-Conformant Elements

The information above, together with our on-site review, points out the following non-conformant elements:

1. None of these assembly areas provide enough accessible seating areas, according to UFAS 4.1.2(18)(a).
2. The wheelchair accessible spaces in the Omni Theater were not long enough to accommodate a wheelchair when viewing a presentation and were 59" deep instead of the required 60" deep for side approach (UFAS 4.33.2) or alternately 48" depth with a minimum 36" wide accessible approach route.
3. In the Wright Theater, the wheelchair viewing positions are located on the very front row, close to the screen and no wheelchair spaces are located at the top tier of the seating bowl to provide lines of sight comparable to those for all viewing areas per UFAS 4.33.3. This is not a problem in the live performance theaters, nor in the Omni and Planetarium theaters.
4. In the Planetarium, each of the two approach/egress ramps that lead to/from the entrance doors to the seating areas lack horizontal extensions at the top ends of the handrails as required by UFAS 4.8.5(2).
5. The Shapiro Live Science Area stage is accessed via a ramp located "stage left" which has a slope that is steeper (at 10.3%) than the maximum allowable 8.3% per UFAS 4.8.2.
6. The live demonstrations provided on the stage of the Theater of Electricity periodically include times where a member of the audience is asked to come up on stage to model a particular scientific attribute of electricity, but the stage level is not on an accessible route from the approach route floor due to a large step up or very narrow and steep side ramps per UFAS 4.5.2 and 4.8.

#### 3.5.2.1.3 Interior Accessible Route (UFAS 4.6)

NASA's review revealed that the MOS has an interior accessible route that begins at the automatic door at the main lobby entrance on level 1 and the elevators at the parking deck in the blue wing on level 1. Both ingress routes link up in the ticketing area and the accessible admissions gates in the lobby.

#### UFAS Non-Conformant Elements

These routes included the following non-conformant elements:

1. One of the carpet tiles was coming loose.
2. A wall mounted exhibit in the Making Models room (Blue Wing level 1) was mounted 32-33" above floor and 6-9" from wall (cannot be more than 4" into the accessible route if the bottom edge of the exhibit is between 27" and 80" off the floor), which does not comply with UFAS standard 4.4.1; additionally, the Hecker survey photos identify all other interactive exhibit kiosks, displays and other elements that are not cane detectable to blind and visually impaired visitors.

3. Several queue areas that used either a "velvet rope" stanchion or a single-tape retracta-belt posts for queue control did not comply with UFAS requirements because they are not cane detectable for people with vision impairments.
4. At the stair tower next to the Machines & Transportation Exhibit (Blue Wing – Lower Level); at the underside of the stair just beyond the interior side of the elevator door on Level 1 along the designated accessible route leading from the parking deck to the Ticket Booth area; and, just outside back door of the Red Wing elevator used to access the Wedding Pavilion area, the exposed underside of stairs limited the head height along the circulation route used by the public to less than the minimum 80" per UFAS 4.4.2.
5. The route to the enclosed platform lift that serves the Mezzanine level of the Discovery Center slopes steeper (at 10.3%) at the door of the lift than the maximum allowable 2% (considered level) under UFAS 4.13.6.
6. The route out the door to the Tables on the Balcony of the d'Arbeloff Suite has a plywood ramp that slopes steeper (at 19.6%) at the door of the lift than the maximum allowable 2% (considered level) under UFAS 4.13.6 and also has an abrupt level change at the bottom edge (at 3/4" high beveled 1:1) that exceeds the maximum allowable 1/2" height and bevel slope of 1:2 per UFAS 4.5.2.
7. The route to the Men's restroom near the Shapiro Live Science Area requires visitors to negotiate 6 steps down to the restroom elements without an alternate accessible route per UFAS 4.3.8 and the door into the Women's restroom across the hall has an entry door that does not allow at least 32" clear passage width and an interior vestibule threshold that is higher than 1/2" with a bevel that is too steep at 1:1 slope per UFAS 4.13.5 & 4.5.2.
8. The pair of doors leading from the rear elevator door lobby (Red Wing - Lower Level) to the hall serving the Hornblower Classroom/Conference Room do not offer a minimum 32" clear passage width for either door leaf which allows only 27 5/8" passage width (note that the other end of this hallway has a pair of doors that have been modified to allow one leaf to allow at least 32" clear passage width) per UFAS 4.13.4.
9. As part of the recently Skyline Room alterations on the 6th Floor of the Administrative "Tower" the new entry door to the Human Resources/Volunteer Services Office lacks (at only 12 1/2") the minimum required 18" latch side, pull side maneuvering space required to allow a wheelchair user to open the door conveniently per UFAS 4.13.6.
10. In the newly renovated Gordon Wing administrative offices, there is a new enclosed platform lift that connects the lower level office spaces (including the Gordon Classroom) to the new offices on the Mezzanine Level above in violation of UFAS 4.1.6(2) & 4.1.2(5).



**Figure 2. Single-tape retracta-belt post at Cafe**



**Figure 3. Double-tape belt posts at Omni-Theatre**

#### 3.5.2.1.4 Exterior Accessible Route (UFAS 4.6)

The review revealed that there is a designated accessible route linking all elements of the MOS facility inside the building, from the building exterior. The exterior accessible route consists of a sidewalk that runs alongside the MOS and connect to the access road that links to Highway 3 (River Road) on both ends. There are crosswalks from this sidewalk to sidewalks on the other side of the access road that run alongside Highway 3. There is a second sidewalk that runs alongside the access road on the other side on an island that separates the access road from Highway 3. Both sidewalks are constructed with concrete, but on the MOS side there is a large area that has a brick paver surface, and this surface connects to the accessible entrance.

#### UFAS Non-Conformant Elements

This route includes the following non-conformant elements:

1. No curb ramps at the crosswalk in the access road on the Boston side.
2. Lack of minimum clear width on the sidewalk that runs alongside the access road on the island side due to mounted sign poles in the sidewalk (31", which is less than the "pinch point" allowance that can be applied to doorways). This sidewalk is served by curb ramps on both ends of the island when the access road connects to Highway 3.
3. Cross-slopes (right/left pitch) of the sidewalk that can cause a wheelchair to tip on its side that exceeds the 2% maximum at various points on the sidewalk on the MOS side of the access road.
4. Changes in level beyond the ½" maximum at sidewalk joints or by sidewalk cracks/upheavals or by bricks that are raised or upheaved, as well as at the bottom of curb ramps where they meet the access road.
5. Excessive slope on the flares (side ramps) and run of the curb ramps, including an 11.7% running slope on the main entry curb ramp at the Loading Zone.

MOS staff advised the NASA reviewing team that this area will be reconstructed in the near future and is collaborating with Massachusetts DCR on the project, because DCR owns or maintains much of the area. A review of the project description from DCR revealed that the project scope includes accessibility improvements and upgrades to the pedestrian access area (sidewalks, curb ramps and crosswalks). Of particular concern with regard to this planned alteration is the issue of reconstructing the main entry stairs from the public sidewalk along River



Road. The proposed plans provided for the reconstruction of these approach stairs, but do not include an adjacent accessible ramp as required by UFAS 4.1.6(1)(a).

3.5.2.1.5 Parking Deck (UFAS 4.6):

There are a total of 21 accessible spaces for 920 total parking spaces in the Museum Deck. Each floor has at least one designated van accessible parking space.

UFAS Non-Conformant Elements

NASA identified the following non-conformant elements in the parking areas:

1. Some accessible parking spaces were not the required width (96" wide).
2. Several instances of low sign placement were observed on most floors, where the signs were mounted on deck walls that were no higher than 34" in height at the bottom, well below the vehicle hood height.
3. On the 5th Level of the Deck, the threshold at the Elevator Lobby entry door has broken concrete creating an abrupt level change of 1/2" without any accessible beveled slope as required by 4.5.2.
4. On the ground level, the right-most designated accessible parking space lacks a marked access aisle on the right side (in front of the loading dock door) in violation of UFAS 4.6.3.



**Figure 4. Blue Accessible Parking Signs In MOS Second Level Parking**



**Figure 5. "Van Accessible" Parking Sign on the 4th Level of the MOS Parking Deck**

3.5.2.1.6 Ramps (UFAS 4.8)

The MOS has ramps providing access when there is a change in grade levels greater than ½ inch (not including curb ramps) in the following areas:

- Parking deck (leading to elevator)
- From Theater of Electricity on the Lower Level to Level 1.
- From Discovery Center to the Planetarium in the Red Wing on the level 1.
- From a Bird's World to Shapiro Family Science Live! Stage in the Green Wing, Lower Level.
- Within Cahners Computer Place in the Blue Wing, Level 1.
- From the Red Wing Lower Level elevator lobby to the Public Restrooms serving this area.
- From the Red Wing Lower Public Restrooms serving this area to the Classrooms below the Omni Theater.
- From the Museum back door to the approach walk leading to the Wedding Pavilion tent.

UFAS Non-Conformant Elements

The following non-compliant features were identified on the ramps provided at the MOS:

1. At the main entrance ramp for those parking on the ground level of the Museum Parking Deck the handrail on the end of the intermediate ramp landing encroaches 5" into the minimum required 60" landing length per UFAS 4.8.4 and the bottom ramp run has no horizontal handrail extension required by UFAS 4.8.5(2).
2. The 1970's concrete ramp on the Lower Level Blue Wing (at the loading dock door) which is used as the approach ramp to the Theater of Electricity/WeatherWise Exhibit and also is used as part of the accessible route from the "Overnight Program Entrance" in the parking deck has compliant slopes and handrails, but lacks intermediate landings every 30" of ramp run rise per UFAS 4.8.2 & 4.8.4 as the only intermediate landing is situated approximately 36" down from the top of the upper ramp run.
3. The ramp leading up from the Discovery Center to the Omni/Planetarium level of the Red Wing lacks the required horizontal handrail extensions on the lower end of the ramp per UFAS 4.8.5(2).

4. The plywood ramp at the back door is steeper (at 8.6%-10.2%) than the maximum allowable 8.3%, lacks edge protection and also lacks horizontal handrail extensions at the bottom of the ramp run required by UFAS 4.8.2, 4.8.7 and 4.8.5 respectively.
5. The ramp leading from the Red Wing Lower Level elevator lobby to the Public Restrooms serving this area have no horizontal extensions on each handrail as required by UFAS 4.8.5(2).
6. The ramp leading from the Red Wing Lower Public Restrooms serving this area to the Classrooms below the Omni Theater have no horizontal extensions on each handrail as required by UFAS 4.8.5(2).

#### 3.5.2.1.7 Elevators (UFAS 4.10)

The MOS has four elevators. There is one elevator which provides access from the parking deck to the main Museum Entrance Lobby. There is an elevator in the Blue Wing which serves the 3 exhibition levels in that wing, but not the lower level of the Theater of Electricity. There is an elevator in the Green Wing (the "Tower" elevator which are accessible via keycard only and not open to exhibit floor visitors) which serves the 4 exhibition levels in this wing and the "Tower" administrative offices. There is one elevator in the Red Wing, which provide access to the Nichols Gallery on Level 2, the Omni Theater Mezzanine, the 3rd Floor d'Arbeloff Suite, and the Wedding Pavilion/Live Animal Exhibits/Classrooms on the Lower Level.

#### UFAS Non-Conformant Elements

The only non-compliant element was the lack of contrast between the floor numbers and the panel on the elevator control panel for the red wing elevator located adjacent to the Discovery Center and Riverview Café.

#### 3.5.2.1.8 Toilet Rooms for Women (UFAS 4.17-4.19)

The MOS has the following restrooms, which include accessible features: The d'Arbeloff Suite restrooms on the 3rd Floor, the Omni Theater Mezzanine restrooms, the Gordon Wing Computer Lab restroom, the Gordon Wing Classroom restroom, Gordon Wing bathrooms, Lower Level Red Wing, Level 1 Red Wing (Food Court) and Level 1 Blue Wing. Modifications for accessibility have been made to the 6th Floor and 4th Floor "Tower" administrative restrooms. The MOS has not identified any of the restrooms on the Lower Level Green Wing, the Level 2 of the exhibition space, the single user restroom serving the Nichols Gallery, the 3rd Floor "Tower" restrooms serving the Educator's Resource Center, the 5th Floor "Tower" restrooms serving only administrative offices or the Lower Level of the Blue Wing as accessible.

#### UFAS Non-Conformant Elements

NASA identified the following non-conformant elements in the accessible restrooms:

1. Red Wing Level 1 (Food Court) restroom had: toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); grab bars between 37 and 39 inches above the floor (UFAS requires 33 to 36 inches); did not include insulated hot water or drain pipes under lavatories; wall mounted hand dryer projects further than 4" from wall between 27"-80"; no U-shaped pull on interior side of accessible stall door; toilet paper is mounted further than 36" from the rear wall in the accessible stall; and, side grab bar is set further (at 13 1/2") than the maximum allowable 12" from the rear wall.
2. Blue Wing Level 1 restroom had grab bars 48 inches from the back wall (UFAS requires 54 inches); grab bars 38-40 inches above the floor (UFAS requires 33 to 36 inches); space between grab bar and wall was 1-3/4 inches (UFAS requires exactly 1-1/2 inches); toilet seat 19 3/4" above the floor (UFAS requires 17 to

19 inches); the side grab bar is set further (at 14") than the maximum allowable 12" from the rear wall; and lack of a 29 inches clearance from the floor to the bottom of the lavatory apron.

3. Lower Level Red Wing Women's restroom: The wall mounted feminine napkin dispenser projects further than 4" into the circulation route between 27"-80"; wall mounted hand dryer projects further than 4" from wall between 27"-80"; did not include insulated hot water or drain pipes under lavatories; the bottom of the mirror is mounted higher than 40"; the thumb latch on the accessible stall door requires tight pinching to operate; the toilet is centered 1" closer to the side wall at 17"; and, the toilet paper dispenser is mounted further than 36" from the rear wall.
4. Omni Mezzanine Level Women's restrooms: the entry door threshold is 3/4" high and not beveled at 1:2 max. slope; the tactile room identification sign is mounted on the door rather than on the wall to the latch side of the door; did not include insulated hot water or drain pipes under lavatories; the button for the wall mounted hand dryer is too high at 56"; the thumb latch on the accessible stall door requires tight pinching to operate; the toilet paper dispenser is mounted further than 36" from the rear wall; toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); grab bars 46-49 inches from the back wall (UFAS requires 54 inches); grab bars 37 inches above the floor (UFAS requires 33 to 36 inches); the side grab bar is only 48" from the back wall (UFAS requires 54 inches); the toilet is centered 1 1/2" closer to the side wall at 16 1/2"; and, the accessible stall door lacks the minimum required 42" deep push side forward approach maneuvering space (at only 20") due to the location of the angled Theater wall.
5. Gordon Wing Computer Lab Women's restroom: wall mounted hand dryer projects further than 4" from wall between 27"-80"; did not include insulated hot water or drain pipes under lavatories; the side grab bar is only 48" from the back wall (UFAS requires 54 inches); the toilet paper dispenser is mounted further than 36" from the rear wall; no U-shaped pull on interior side of accessible stall door; and, the feminine napkin dispenser has inaccessible knob pulls which require pinching to operate.
6. Gordon Wing Classroom Restroom: the bottom of the mirror is mounted higher than 40"; no U-shaped pull on interior side of accessible stall door; toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); and, wall mounted hand dryer projects further than 4" from wall between 27"-80".
7. Unisex Gordon Wing Bathrooms - there are two single user, unisex restrooms within the small locker room area which also includes two shower rooms. One of the two restrooms is identified as an accessible restroom and the other is not designed and constructed with accessible features in violation of UFAS 4.1.2(10) which requires "...each public and common use toilet room shall comply with 4.22" and requires "each public and common use bathroom shall comply with 4.23." This means there should be two accessible single user restrooms and two accessible shower rooms. The accessible shower room complies with UFAS and the other does not have any accessible features required by UFAS. The following elements of the designated accessible single user restroom are not compliant: the tactile room identification sign is mounted on the door rather than on the wall to the latch side of the door; the lower of the two wall mounted mirrors is mounted with the bottom higher (at 40 1/2") than the maximum allowable 40"; and, toilet seat is 20 inches above the floor (UFAS requires 17 to 19 inches).
8. d'Arbeloff Suite Women's restroom: the entry door threshold is 1/2" high and not beveled at 1:2 max. slope (at 1:1 bevel); the tactile room identification sign is mounted on the door rather than on the wall to the latch side of the door; did not include insulated hot water or drain pipes under lavatories; the toilet is centered 5" too far from the side wall at 23"; the gap between the wall and the grab bars is larger (at 2") than 1 1/2"; the grab bars are mounted 3" too low at 30" high; the side grab bar is set further (at 14") than the maximum allowable 12" from the rear wall; the rear grab bar is set further (at 8") than the maximum allowable 6" from the side wall; no U-shaped pull on interior side of accessible stall door; and the coat hook on the back of the accessible stall door is mounted too high at 68".

### 3.5.2.1.9 Toilet Rooms for Men (UFAS 4.17-4.19)

#### UFAS Non-Conformant Elements

NASA identified the following non-conformant elements in the accessible restrooms:

1. In the men's Level 1 Blue Wing restroom: toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); grab bars 46-49 inches from the back wall (UFAS requires 54 inches); space between grab bar and wall was 1-3/4 inches (UFAS requires exactly 1-1/2 inches); the latch side, pull side maneuvering space at the restroom entry door (at only 6") is less than the minimum 18" required; the lowered urinal lip is 1/2" too high; the toilet in the accessible stall is mounted 3/4" too far from the side wall; grab bars 38-40 inches above the floor (UFAS requires 33 to 36 inches); and, did not include insulated hot water or drain pipes under lavatories;
2. In the men's restroom at Level 1 of Red Wing (Cafe Restroom): the entry vestibule has a 4.5% cross slope; the privacy wall in the entry vestibule provides only 34" of the required 48" turning space per UFAS Fig. 7(b); wall mounted hand dryer projects further than 4" from wall between 27"-80"; did not include insulated hot water or drain pipes under lavatories; the side grab bar is only 50" from the back wall (UFAS requires 54 inches); grab bars 38-40 inches above the floor (UFAS requires 33 to 36 inches); toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); no U-shaped pull on interior side of accessible stall door; and, the toilet paper dispenser is mounted further than 36" from the rear wall.
3. In the men's restroom at the Lower Level Red Wing: wall mounted hand dryer projects further than 4" from wall between 27"-80"; did not include insulated hot water or drain pipes under lavatories; the bottom of the mirror is mounted higher than 40"; the thumb latch on the accessible stall door requires tight pinching to operate; the rear grab bar is mounted 4" too far from side wall; and, the toilet paper dispenser is mounted further than 36" from the rear wall.
4. Omni Mezzanine Level Men's restrooms: the entry door threshold is 3/4" high and not beveled at 1:2 max. slope; the tactile room identification sign is mounted on the door rather than on the wall to the latch side of the door; did not include insulated hot water or drain pipes under lavatories; the button for the wall mounted hand dryer is too high at 56"; the thumb latch on the accessible stall door requires tight pinching to operate; the toilet paper dispenser is mounted further than 36" from the rear wall; toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); grab bars 46-49 inches from the back wall (UFAS requires 54 inches); grab bars 37 inches above the floor (UFAS requires 33 to 36 inches); the side grab bar is only 48" from the back wall (UFAS requires 54 inches); the toilet is centered 1 1/4" closer to the side wall at 16 3/4";
5. Gordon Wing Computer Lab Men's restroom: wall mounted hand dryer projects further than 4" from wall between 27"-80"; did not include insulated hot water or drain pipes under lavatories; the side grab bar is only 48" from the back wall (UFAS requires 54 inches); the toilet paper dispenser is mounted further than 36" from the rear wall; no U-shaped pull on interior side of accessible stall door; and, the urinal flush valve is mounted 1" too high at 45".
6. Gordon Wing Classroom Restroom: the bottom of the mirror is mounted higher than 40"; no U-shaped pull on interior side of accessible stall door; toilet seats 20 inches above the floor (UFAS requires 17 to 19 inches); and, wall mounted hand dryer projects further than 4" from wall between 27"-80".
7. d'Arbeloff Suite Men's restroom: the entry door threshold is 1/2" high and not beveled at 1:2 max. slope (at 1:1 bevel); the tactile room identification sign is mounted on the door rather than on the wall to the latch side of the door; did not include insulated hot water or drain pipes under lavatories; the toilet is centered 5" too far from the side wall at 23"; the gap between the wall and the grab bars is larger (at 2") than 1 1/2"; the grab bars are mounted 3" too low at 30" high; the side grab bar is set further (at 14")

than the maximum allowable 12" from the rear wall; the rear grab bar is set further (at 8") than the maximum allowable 6" from the side wall; no U-shaped pull on interior side of accessible stall door; the urinal lip is mounted too high at 25"; and, the approach route to the accessible stall is 1" too narrow at 41".

#### 3.5.2.1.10 Telephones (UFAS 4.31)

Two public telephones are located on the first floor one in the red wing and one in the green wing and both include TTY features. The red wing phone bank meets UFAS standards. The wall mounted public phone at the Coat Check Counter dedicated to calling for Taxi Services is too high for wheelchair users to reach and use.

#### UFAS Non-Conformant Elements

The highest operable part of the Green Wing telephone is 56 inches above the floor. This exceeds the reach ranges for both a front approach (48 inches) and side approach (54 inches).

#### 3.5.2.1.11 Accessible Alarm System (UFAS 4.28)

#### UFAS Non-Conformant Elements

No accessible alarm system (strobe lights) was observed on the Exhibit floors.

#### 3.5.2.1.12 Signage (UFAS 4.30)

#### UFAS Non-Conformant Elements

The review revealed that there were few locations that accessible signage were installed and no rooms on the exhibits floors had accessible signage. While UFAS does not require braille, but does require raised letters, no such signage was seen.

#### 3.5.2.1.13 Restaurants (UFAS 5)

The MOS has one restaurant, the Riverview Café, which is located on Level 1. There are also vending machines in the vicinity. The Riverview Café can hold approximately 200 visitors and can be converted for use for evening functions (banquets, weddings, etc.).

#### UFAS Non-Conformant Elements

NASA noted the following non-compliant elements:

1. height of self-service shelves exceeded the maximum height of 46" for a side reach over an obstruction per UFAS 4.2.6;
2. tray sides are higher (at 34 3/8") than the 34" maximum allowance above the floor; and,
3. with the exception of the nine 60" round tables, none of the other tables nor the long eating bar along the window wall provide for the minimum required knee/toe clearance required by UFAS 4.32.3.

#### 3.5.2.1.14 Mercantile (UFAS 7)

NASA's review revealed that the MOS has two locations for stores where gifts, apparel, toys and other items can be purchased; the Museum Store on Level 1 near the Riverview Café and in the Special Exhibit Store in the Green

Wing on Level 2. Additionally, as noted below, NASA identified one technical violation at the main ticket sales window.

#### UFAS Non-Conformant Elements

At each location (not including the main ticket sales window), the only UFAS 7.2 non-compliant issues NASA found were:

1. height of counters exceeded the maximum height of 34" at 36 ¼" and,
2. no alternative counter with a maximum height of between 28" to 34" was provided.

In addition, at the main ticket sales window, no cash register location has a lowered counter area meeting the alternative counter requirements outlined above. A compliant lowered counter space is available immediately adjacent to the left of the main ticket sales area and MOS can bring its main ticket area into full compliance by ensuring that this location is converted into an active sales location.<sup>94</sup>

#### 3.5.2.2 Planned Alterations

MOS Facilities Director informed NASA that some portions of the facility are scheduled for renovation. Specifically, the Planetarium is scheduled to undergo complete reconstruction in the near future and the vehicle access area (including the sidewalks) in the next several years. Because alterations are subject to very strict requirements,<sup>95</sup> MOS will need to ensure that it complies fully with all requirements in these upcoming projects.

With respect to the vehicle access area, the MOS Facilities Director informed NASA that it is working with the Massachusetts Department of Conservation and Recreation (DCR) to reconstruct the island portion of the vehicle access area (between the vehicle access road and State Highway 3) since the right-of-way for State Highway 3, which runs alongside the MOS is operated and maintained by the DCR, since the MOS sits on a dam on the Charles River, which is also maintained and operated by the DCR. The MOS must also work with the cities of Boston and Cambridge, since the MOS lies in both jurisdictions. The DCR will reconstruct the island sidewalk in the near future, while the MOS will reconstruct the sidewalk area on the MOS side opposite the island. As noted above, these areas include several deficiencies that will be addressed as part of this renovation.<sup>96</sup>

#### 3.5.3 Compliance Recommendations

Section 504 program access includes access to both existing and newly constructed or altered facilities. For existing facilities, Section 504 does not require structural changes to the extent that programs and activities are

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<sup>94</sup> The current MOS system is further complicated by the fact that sales agents serving customers at the lowered counter space area often need to go back-and-forth from their cash registers to facilitate sales transactions. This process can create significant delays for customers with disabilities. As the ticket sales window is likely the first interaction that a person with a disability has with MOS, a negative experience here can taint the overall customer experience at MOS. To improve the overall experience for customers with disabilities, NASA recommends that MOS remedy this issue as soon as possible.

<sup>95</sup> 14 C.F.R. § 1251.302(a)-(c).

<sup>96</sup> See 3.5.2.1.4 *Exterior Accessible Route (UFAS 4.6)*, above.

accessible when viewed in their entirety.<sup>97</sup> Where structural changes are necessary, a recipient needs to develop a transition plan<sup>98</sup> to ensure that program access is maintained.

This report has identified a number of barriers, but MOS does not appear to have created a transition plan to address them. The barriers identified above need to be incorporated into this transition plan. In addition, NASA understands that MOS is expecting to perform a full accessibility audit using an outside consulting firm in the near future. As all of the areas of architectural non-compliance identified in this report either do not conform to the strict alterations requirements under NASA's Section 504 regulations<sup>99</sup> or pose significant barriers to program access, they will need to be addressed as soon as possible alongside the recommendations from their accessibility audit. MOS will still have an obligation to meet additional steps in the transition plan (e.g. providing notice of the plan, specifying the schedule, etc.), as required by NASA regulations.<sup>100</sup>

Describing all of the elements of a good transition plan are beyond the scope of this report, but the Department of Justice resources identified above<sup>101</sup> provide excellent guidance. In particular, the *Title II Action Guide* is focused almost entirely on developing a good transition plan and includes useful checklists and forms that MOS can adapt to meet its needs.

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<sup>97</sup> 14 C.F.R. § 1251.301(a), (d).

<sup>98</sup> The NASA Section 504 regulations at 14 C.F.R. § 1251.301(d) provide,

*(d) Transition plan. In the event that structural changes to facilities are necessary to meet the requirement of paragraph (a) of this section, a recipient shall develop, within 6 months of the effective date of this part, a transition plan setting forth the steps necessary to complete such changes. The plan shall be developed with the assistance of interested persons, including handicapped persons or organizations representing handicapped persons. A copy of the transition plan shall be made available for public inspection. The plan shall, at a minimum:*

*(1) Identify physical obstacles in the recipient's facilities that limit the accessibility of its program or activity to handicapped persons;*

*(2) Describe in detail the methods that will be used to make the facilities accessible;*

*(3) Specify the schedule for taking the steps necessary to achieve full program accessibility and, if the time period of the transition plan is longer than 1 year, identify steps that will be taken during each year of the transition period; and*

*(4) Indicate the person responsible for implementation of the plan.*

<sup>99</sup> 14 C.F.R. § 1251.302.

<sup>100</sup> *Id.*

<sup>101</sup> See section 3.1



## 4. Implementation Strategies

### 4.1 Implementation Priorities

During the course of NASA’s review, the review team identified a number of areas that MOS may consider improving to further its compliance with Section 504. Despite the lack of these improvements, it is not surprising that MOS has had so few complaints from visitors with disabilities. MOS’s most important asset is its dedicated staff. They have shown that they can lead MOS to create an innovative environment and accessible experience for visitors with disabilities. At the same time, future challenges (such as workforce shortages, unexpectedly large crowds, etc.) will place strains on the ability of MOS's staff to meet the needs of its visitors with disabilities. Adopting the recommendations set forth in this report will likely streamline the staff's ability to meet these challenges.

The following implementation plan is divided into three priority levels.

- The first priority covers important areas where program access under Section 504 is at greatest risk. This may include significant existing barriers, important policies and programs that need time to fully develop, or issues that are currently of high significance to the disability community.
- The second priority includes issues that pose less risk under Section 504. For MOS, this can include, for instance, areas of noncompliance that do not appear to pose an immediate risk to program access.
- The third priority includes elements that may be technically not required under Section 504, but may be added to augment or further enhance accessibility for people with disabilities. Adopting these requirements may enable MOS to truly become a "best practice" in every element of its programs.

This section is organized with a summary of the elements in each priority level and a brief discussion of the rationale for inclusion of the element at that priority level. The tables at the beginning of each discussion also include references to the sections of this report discussing each element in more detail.

#### 4.1.1 Priority 1 Recommendations

<b>Priority 1</b>	<ol style="list-style-type: none"><li>1. Designate a clear DRE, publicize to all employees, and ensure public visitors can identify the DRE. Ensure DRE has access to senior management and authority to effect policies. (3.1.2)</li><li>2. Improve front desk materials to include specific guidance for visitors with disabilities (3.2.2)</li><li>3. Create refresher training program specific to disability issues and processes (3.3.2)</li><li>4. Improve comment cards to include feedback information and better complaint info (3.2.2)</li><li>5. Formalize the grievance process and make it better known (3.2.2)</li><li>6. improve brochures to ensure visitors understand the complaint process (3.2.2)</li><li>7. Ensure that architectural barriers at MOS are reviewed (3.5.3)</li><li>8. Accessibility team to create a transition plan and perform regular self-evaluations (3.5.3)</li></ol>
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Based on our interviews within MOS, NASA found that many people were committed to ensuring accessibility for people with disabilities, but no one individual acted as the "go to person" on accessibility issues. Section 504 places a strong emphasis on ensuring that there is a clear designated responsible employee (DRE), because it takes strong leadership and coordination to balance the concurrent responsibilities among different stakeholders within an organization and to ensure that accessibility improvements proceed along a clear path. Furthermore, employees and visitors to MOS need to have a final point-of-contact for resolving issues and for making accommodations. NASA also believes that, given the many recommendations in this report, having a clearly designated DRE is critical for coordination and implementation.

For MOS visitors, the front desk serves as their first "point of contact" for their visit and, in many instances, the extent of their customer service experience. Therefore, having specific guidance available for assisting people with disabilities is likely more important here than anywhere else in MOS. Front desk personnel need to triage requests from visitors and therefore need information "at their fingertips" on assisting people with disabilities.

On a related note, developing an excellent refresher training program specific to disability issues and processes will go a long way towards ensuring that employees (including front desk personnel) are better able to meet the needs of visitors with disabilities. Although the MOS has a very good two-day employee training program, employees also need refresher training to keep their skills sharp and to be kept up-to-date on new strategies and new resources. NASA believes that developing a refresher training program should also be a key priority, given the time required to develop and refine an excellent program and the high sustained value that such a program can return for ensuring program access.

The complaint and grievance process within MOS also needs to be better known among employees and visitors. In correspondence with NASA, MOS outlined a very specific grievance and appeal process, but this information did not seem well documented or known to MOS employees. In addition, the one complaint that MOS identified could not be adequately investigated because the comment cards do not solicit enough information. These facts suggest that the visitor feedback mechanisms (such as comment cards) need to be revised to solicit better information and that the complaint and grievance processes should be publicized more clearly to visitors and employees.

Much of this report has reviewed the architectural barriers in the MOS facility. Because much of the facility pre-dates UFAS and modern accessibility requirements, it is almost inevitable that MOS will have some architectural barriers. MOS has been proactive about this issue and has indicated that they will be performing another review in the near future. MOS will also have to consider overall program access as part of their transition plan, which should be undertaken by their DRE and Accessibility Team.

Performing a transition plan and self-evaluation of program access is critical under NASA's Section 504 requirements.<sup>102</sup> During our review, our team did not find any evidence that MOS had ever conducted a self-

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<sup>102</sup> 14 C.F.R. § 1251.105(c) provides,

*(c) Self-evaluation. (1) A recipient shall, within 1 year of the effective date of this part; or within 1 year of first becoming a recipient:*

*(i) Evaluate, with the assistance of interested persons, including handicapped persons or organizations representing handicapped persons, its current policies and practices and the effects thereof that do not or may not meet the requirements of this part;*

evaluation—even though performing a self-evaluation is required by NASA regulations or by similar regulations of other Federal agencies providing grants to MOS. While our review and recommendations may form the basis of a preliminary transition plan, additional and ongoing review of overall program access is important. Given the thoroughness of the review, NASA believes that our recommendations and proposed implementation plan will go a long way towards ensuring program access.

#### 4.1.2 Priority 2 Recommendations

<b>Priority 2</b>	<ol style="list-style-type: none"> <li>1. Ensure that MOS employees understand how to request sign language interpreters or auxiliary aids and services (3.3.2)</li> <li>2. Ensure that MOS visitors understand how to request sign language interpreters or auxiliary aids and services (3.3.2)</li> <li>3. Continue MOS Accessibility Team (3.1)</li> <li>4. Ensure that Front Desk personnel in particular have specific disability training (3.3.2)</li> <li>5. Develop resources on MOS intranet that build on elements of refresher training (3.3.2)</li> <li>6. Create “loaner handouts” of popular publications in alternate formats and ensure that MOS internet and intranet are accessible (3.4.2)</li> </ol>
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Providing effective communication through the use of sign language interpreters or other auxiliary aids and services is a very important requirement to fulfill nondiscrimination requirements.<sup>103</sup> In addition, the disability

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*(ii) Modify, after consultation with interested persons, including handicapped persons or organizations representing handicapped persons, any policies and practices that do not meet the requirements of this part; and*

*(iii) Take, after consultation with interested persons, including handicapped persons or organizations representing handicapped persons, appropriate remedial steps to eliminate the effects of any discrimination that resulted from adherence to these policies and practices.*

*(2) A recipient that employs 15 or more persons shall, for at least 3 years, follow completion of the evaluation required under paragraph (c)(1) of this section, maintain on file, make available for public inspection, and provide to the Assistant Administrator upon request:*

*(i) A list of the interested persons consulted;*

*(ii) A description of areas examined and any problems identified; and*

*(iii) A description of any modifications made and of any remedial steps taken.*

<sup>103</sup> 28 C.F.R. § 35.164 of the ADA Title II regulations requires public entities to ensure effective communication unless “it can demonstrate [that doing so] would result in a fundamental alteration in the nature of a service, program, or activity or in undue financial and administrative burdens.” This obligation is identical to NASA’s responsibilities under Section 504, 14 C.F.R. § 1251.560(d), and is a key element to ensuring program access.

community has been extremely active in advocacy efforts for these requirements. While MOS has done exemplary work in researching the needs of users who are deaf or hard of hearing, it may further limit its risk exposure by developing a clear process for requesting sign language interpreters and other auxiliary aids or services– and publicizing this process to ensure that employees and visitors understand it.

NASA’s review at MOS also found many "best practices" for meeting the needs of people with disabilities within the organization. These valuable resources, however, are scattered throughout the organization. MOS has responded by creating an "accessibility team" that brings together these resources would help ensure that knowledge is shared within the organization. By having team members work collaboratively, MOS can extend best practices throughout the organization and ensure that MOS creates a common vision and culture of accessibility.

Ensuring that the front desk personnel are highly trained and the training resources are available on the MOS intranet extends the priority 1 recommendations for creating a refresher training program specific to disabilities.

Effective communication is an important element of any program, particularly programs involving exhibition or education. Printed materials and information on an organization’s website is intended for independent review and should, to the maximum extent feasible, be made available in an accessible format. While braille is the preferred format for many blind users, the majority of people who are blind or visually impaired do not read braille and will be better served by large print or audio formats. This is particularly true for older visitors with vision impairments. To meet the needs of as many users as possible, MOS should consider outsourcing for the creation of several “loaner copies” of its most popular handouts (in a variety of formats) and making these available at the front desk.

Websites are also becoming more and more important for providing information about its programs and services. Private sector companies are increasingly finding themselves the target of investigations and litigation (initiated both by government enforcement agencies and private litigants) under Title III of the ADA and state accessibility laws. MOS has indicated that it is currently revising its web site to conform to the requirements of WCAG 2.0, and we encourage them to use them to aspire to maintaining their site at WCAG 2.0 level AA at a minimum.

<b>Priority 3</b>	<ol style="list-style-type: none"> <li>1. Update all employee materials (handbook, training manual, front desk manual) and customer material (online information, ticketing, and brochures) references URL maintaining grievance process (3.2.2)</li> <li>2. Ensure that employee resources (handbook, training manual, and front desk manual) reference elements on MOS intranet on refresher disability training (3.3.2)</li> </ol>
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Updating all employee and customer material to reference the training resources made available on the MOS intranet further extends the priority 1 recommendations for creating a refresher training program specific to disabilities. This helps align expectations and "ways of doing things" within MOS and results in a more positive and uniform visitor experience.

#### 4.2 Proposed Implementation Plan

Implementing any set of requirements within an organization can often be difficult because doing so requires the buy-in and coordination among a number of different stakeholders within the organization. In addition, some lower priority items may be easier to accomplish in the short-term than higher priority item.

The following implementation plan is only a recommendation and is not intended to supplant MOS's strategic management. NASA believes that the value of this cross-functional flowchart is to illustrate how different stakeholder groups can be aligned to accomplish all of the recommendations included in this report.

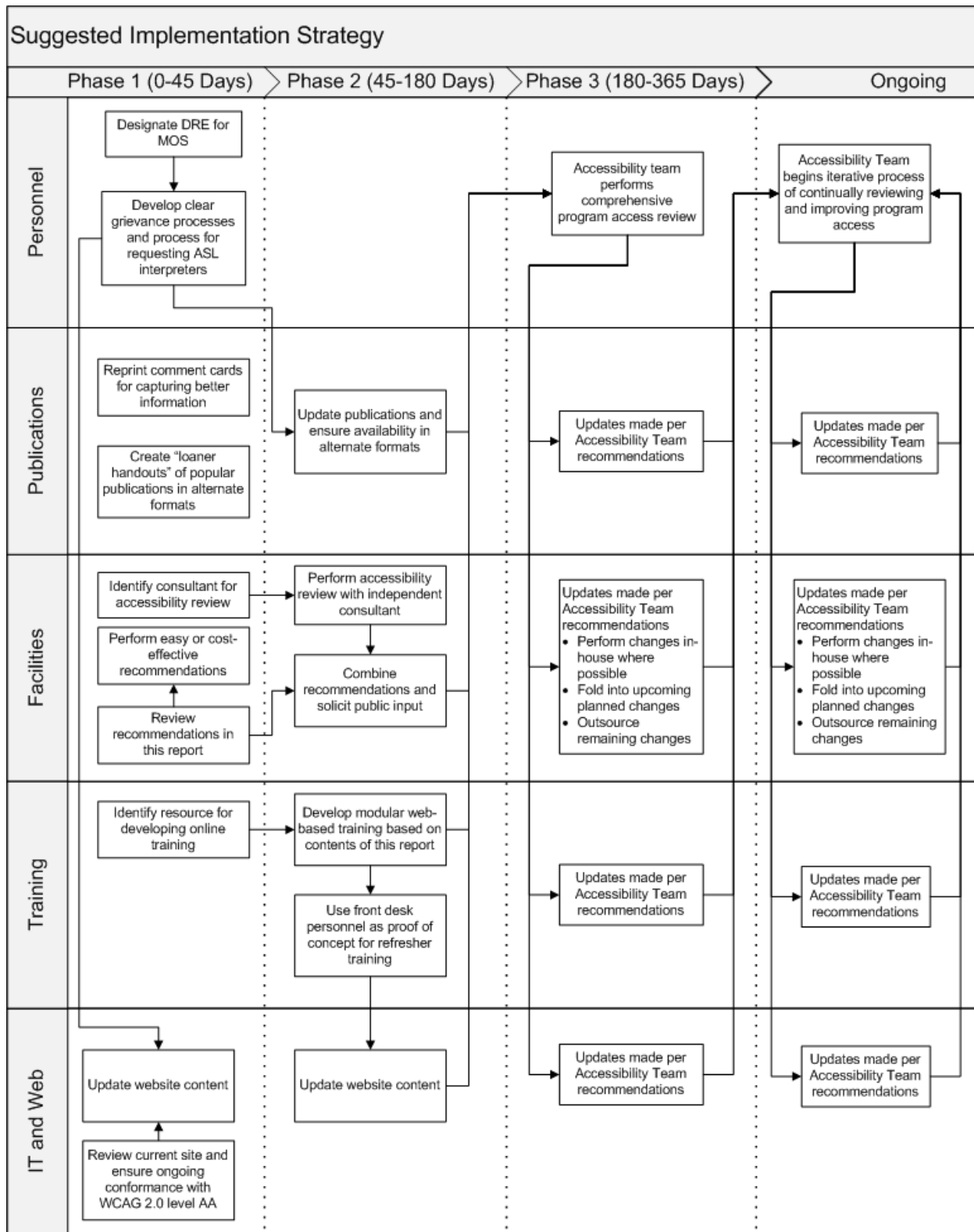


Figure 6. Suggested Implementation Plan