
**Regulatory Assessment
of
Americans with Disabilities Act
and
Architectural Barriers Act
Accessibility Guidelines
Proposed Rule**

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Developed for the:
**US Architectural & Transportation
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I. INTRODUCTION

SCOPE AND PURPOSE

This report assesses the regulatory impact of the Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines Proposed Rule (NPRM). In developing this report, the scope has been focused on the impact this rule would have on new construction. In addition, the assessment has been limited to those items/issues that exceed the following "baseline": current *Americans with Disabilities Act Accessibility Guidelines* (ADAAG), *Uniform Federal Accessibility Standards* (UFAS), current federal policies, current industry practice, *International Building Code*, and ICC A117.1-1998, *Accessible and Usable Buildings and Facilities*.

This report assesses the impact of the NPRM at three levels: the impact of specific "items", on a per-item basis; the impact of these same items on a series of "typical" buildings of various occupancy types; and the national impact, on an annual basis, for the same "typical" building types.

In developing this assessment, numerous assumptions were required. Because the impact of the NPRM is not being assessed for any specific project, some assumptions were required as to current practice for the various building types considered. Where assumptions regarding current design practice, or a solution for complying with the NPRM, have been made, they are explained in the text for that item or building type.

The following paragraphs explain the rationale for the selected baseline, the limitation to new construction impact, and the organization of the remainder of the report.

"BASELINE" DOCUMENTS AND PRACTICES

In developing this regulatory assessment, it has been assumed that any current general industry practice, and any provision currently required by federal accessibility regulations, federal policy, or by model building codes and standards, creates no additional impact by being incorporated into the NPRM. Each of these "baselines" is outlined in the following paragraphs.

Current Federal Regulations

There are a variety of federal regulations currently addressing accessibility. The most relevant to this NPRM are the current regulations addressing the ADA, ABA, and Rule 504. The current ADAAG, developed by the Architectural and Transportation Barriers Compliance Board (the "Access Board") is adopted by the US Department of Justice as the Standards for Accessible Design under Title III of the ADA, and is permitted as an option for state and local governments under Title II of the ADA. The Access Board has also issued a final rules for children's facilities, and for legislative, regulatory, and correctional facilities.

The Uniform Federal Accessibility Standards currently apply to federal facilities covered by the Architectural Barriers Act, entities subject to Rule 504, and can be used by state and local government entities covered by Title II of the ADA.

This NPRM will combine each of these separate documents into a single, three-part, package of federal accessibility guidelines. Therefore, it is assumed that any requirement currently in these documents creates no impact by being included in the NPRM.

Federal Policy

Some provisions covered in this NPRM are already in place because of existing policies of federal agencies. For example, while the General Services Administration (GSA), Department of Defense (DoD), and Department of the Interior (DoI) are currently covered by the ABA, which uses UFAS as its standard, current policy of each of these agencies is that all work comply with both ADAAG and UFAS. Where differences exist between the standards, current policy is to use the more "restrictive" provision, or the provision that provides a higher level of accessibility. The impact of "officially" moving from UFAS to the NPRM is significantly reduced because of the widespread use of current ADAAG by the covered entities.

ICC-ANSI A117.1-1998, *Accessible and Usable Buildings and Facilities*

The A117.1 standard is the consensus standard addressing accessibility. It has been widely used as the basis of state and local accessibility regulations since it was first published in 1980. The 1980 edition of A117.1 also served as the basis for the federal *Uniform Federal Accessibility Standards* (UFAS). Current ADAAG also utilized A117.1-1980 as a base, and added provisions from UFAS, and the 1989 Minimum Guideline Requirements for Accessible Design (MGRAD); current ADAAG aligns quite closely with A117.1-1986 edition in terms of technical requirements. A 1992 edition of A117.1 was published not long after the issuance of ADAAG.

During the revision cycle to develop the 1998 edition, extensive efforts were made to "harmonize" the technical requirements of A117.1 with the recommendations of the Access Boards' ADAAG Review Federal Advisory Committee. This Advisory Committee

worked from 1994 to 1996, and wrote a comprehensive set of recommendations for a "new ADAAG", and issued a final report in the form of a suggested set of new guidelines. The A117.1 Committee formed a joint task group, which worked to identify differences between the two documents, so that both the A117 Committee and the ADAAG Review Advisory Committee could attempt to resolve differences.

The A117.1 standard is the accessibility standard referenced by the model codes. The 1998 edition is referenced in the 1999 BOCA *National Building Code*, 1999 SBCCI *Standard Building Code*, and 2000 ICC *International Building Code Final Draft*. Code development for the other model building code, the ICBO *Uniform Building Code*, ceased in 1997, prior to publication of the 1998 A117.1; the final 1997 edition of the UBC references the 1992 A117.1.

It has been assumed that the widespread use of the A117.1 standard by the model codes, and subsequent use (upon adoption of the model codes) by state and local governments, eliminates the regulatory impact for items contained in both A117.1 and in the NPRM.

International Building Code

Historically, there have been three model codes used in the United States, with their adoption generally divided across three regions. In the northeast, the *National Codes*, published by the Building Officials and Code Administrators, Inc. (BOCA), are the predominant codes. The *Standard Codes*, published by the Southern Building Code Congress International, Inc. (SBCCI), are used in most jurisdictions in the Southeast. In the West, the *Uniform Codes*, published by the International Conference of Building Officials (ICBO), are predominant. In 1994, BOCA, ICBO, and SBCCI formed the International Code Council (ICC), with the goal of developing a single, comprehensive set of model codes by the year 2000. The *International Building Code* (IBC) and *International Fire Code* (IFC) are both in final draft form, and were the subject of extensive code change hearings in March, 1999. Final action on all code change proposals will take place at a joint conference of BOCA, ICBO, and SBCCI in St. Louis between September 12-17, 1999.

The IBC original draft was developed by a series of committees consisting of code enforcement officials from each of the three model code organizations. The committee charged with drafting the accessibility provisions of the IBC utilized the final report of the ADAAG Review Advisory Committee in its work. This committee drafted provisions intended to be consistent with the more stringent of existing model code provisions and the ADAAG Review final report. The IBC has been through two complete code change cycles since the original draft; changes to the accessibility provisions have generally either clarified the provisions, or taken ADAAG Review Recommendations to the next level, furthering the "state of the art".

One area where the model codes have struggled in attempting to develop provisions consistent with current ADAAG is in the regulation of those elements that are generally considered beyond the scope of building code enforcement. Some examples include

general building signs, public telephones, and automatic teller machines. Rather than omit these items from the building code (which is how this has historically been addressed), the IBC incorporates these provisions into an appendix chapter. By including this material in an appendix chapter, it is available to those jurisdictions that wish to expand the scope of building code enforcement to address all the elements needed to ensure facility accessibility. The appendix chapters of the IBC must be specifically adopted at the time a jurisdiction adopts the code. Because these provisions are incorporated within the IBC, it is assumed that they will be widely adopted; therefore, they are not included in this regulatory assessment.

The model building codes have been incorporating the recommendations of the ADAAG Review Advisory Committee for the past several years. Extensive code change proposals were submitted to both the BOCA *National Building Code* and the SBCCI *Standard Building Code* in 1998 to update each code for consistency with the ADAAG Review Final Report and the 1998 ANSI A117.1 standard. These changes were approved in total. The 1999 BOCA *National Building Code*, and the 1999 SBCCI *Standard Building Code* each contain accessibility provisions that are essentially equivalent with those in the IBC final draft, and with the ADAAG Review Final Report. The ICBO *Uniform Building Code* ceased development after publication of the 1997 edition; therefore no changes have been processed in that arena.

Current Industry Practice

In determining whether a provision in the NPRM will have a regulatory impact, the final factor considered was the current general practice for the covered industry. If something in the NPRM reflects current practice, even if not a current requirement in one of the baseline documents, it was assumed to have no regulatory impact.

One example of this is the NPRM provision addressing sightlines over standing spectators in certain assembly occupancies. Although this issue has been the subject of much scrutiny and debate in current ADAAG, current industry practice in new construction is to provide a sightline over standing spectators from wheelchair spaces, where it is anticipated that persons may stand during the event. Therefore, this provision, clearly stated in the NPRM, is assumed to have no regulatory impact.

FOCUS ON NEW CONSTRUCTION

This regulatory assessment focuses on the impact of the NPRM to new construction. By focusing on new construction impact, a more accurate assessment of the impact of the NPRM can be made. Although there may be a significant impact on a wide variety of existing construction, for purposes of this analysis, such impact would be virtually impossible to determine. There are a wide variety of issues that prevent the development of an adequate assessment of the impact of this NPRM on existing construction.

Variations in Existing Building Stock

The existing buildings that are potentially impacted by this NPRM cover a broad spectrum of the built environment. They were built over a span of 100 years or more, under widely varying codes and regulations. Existing buildings have been altered, had additions constructed, changed ownership, and been subjected to changing regulations at the local, state and federal level, all of which have resulted in a broad spectrum of existing building stock. For any “baseline” that would be assumed for the impact of this NPRM on existing buildings, multiple arguments could be made that some other baseline is more appropriate.

Alterations

Because of the widely varying conditions in existing buildings, it is not feasible to establish a realistic baseline for existing conditions that might be impacted by future alteration work. The extent of impact on an existing building undergoing alteration will depend on the existing condition of the building with regard to accessibility, and the extent of work being planned.

Technical Infeasibility. The NPRM specifically provides an exception for alterations (202.3, F202.3) allowing compliance to the “maximum extent feasible” where it is “technically infeasible” to fully comply. This exception is specifically intended to be used on a case-by-case basis.

Leased Facilities

This NPRM proposes changes in the obligations for federal agencies covered by the ABA for leased facilities. For newly constructed facilities, it is assumed that the impact will be similar for facilities owned by federal agencies and those leased by federal agencies. In the “typical” building portion of this report, building type 6 address newly constructed customer service facilities of the United States Postal Service (USPS), and includes both owned and leased facilities.

The impact of this NPRM for leases in existing construction cannot be adequately assessed in the scope of this assessment. To determine the impact for leases in existing buildings, accurate information would be needed regarding: the level of accessibility in existing leased federal facilities (to determine impact when new leases are signed for existing space), and the level of accessibility in the wide variety of facilities that the federal agencies might lease (to determine impact where a new facility is leased).

Operational and Maintenance Impact

By focusing on the impact on new construction, this assessment also does not directly address any operational impact, or any additional maintenance costs, that might result from the NPRM.

ORGANIZATION OF REPORT

The remainder of this assessment consists of three major portions, as follows:

- Items - Analysis
- “Typical” Buildings - Analysis
- National Aggregation - Analysis

The cost estimate report, prepared by S.C. Myers & Associates, Inc., is available from the Board upon request.

Items - Analysis

This section addresses the specific items in the NPRM that exceed the baseline established, and that are considered to have a potential significant impact. For each item identified, the following elements are addressed:

- **NPRM text and Summary of Issue.** This portion excerpts the relevant NPRM text, and then provides an explanation of how the item exceeds the baseline, what the assumed impact may be, and the assumed approaches that would be used to satisfy the requirement.
- **Cost Estimate Methodology.** This portion provides an explanation of the specific assumptions made to develop the estimated cost impact for the item.
- **Unit Cost.** The cost for a single “unit” of the item is provided. Detailed cost breakdown is provided in the cost estimate report, included as an appendix.

“Typical” Buildings - Analysis

This section considers the impact of the studied items on a series of building types. The building types were selected after reviewing the items, to ensure that the types of buildings potentially impacted significantly would be considered.

- **Typical Building Data.** This section explains the characteristics of the selected “typical” building.
- **Rationale/Source.** This section explains the source for the “typical” building information, or the rationale used to develop the typical building characteristics.
- **Applicable Items.** This section lists each item considered to be relevant for the building, and provides an explanation of the assumptions made to determine the

impact of the item. A subtotal cost is provided for each item.

- **Total Cost.** This section indicates the total cost of all items for the “typical” building. Note that in some cases, items included in the typical building are not assumed to apply to all buildings of the occupancy type; adjustments are made as appropriate in the national aggregation calculations.

NOTE: “Typical” building types were selected based on an initial review of the NPRM, and an assumption of the types of facilities that might be directly impacted. In completing the “Item-analysis” part of the assessment, and then applying these items to the typical buildings that were selected, it was determined that some of the buildings selected are not impacted by the items studied. Where a “typical building” is presented as having no impact from the NPRM, it indicates that there is no impact from the items included (which exceed the established baseline).

National Aggregation - Analysis

This section considers the impact of the NPRM on each of the studied building types. It is organized similarly to the building section, and provides national impact estimates for each of the studied building types, as follows:

- **Typical Building Data.** This section identifies the total number of the building type that are assumed to be constructed in a one-year time period.
- **Rationale/Source.** This section explains the source for the national building information, or the rationale used to estimate the national building information.
- **Estimated National Impact by Item.** This section lists each item considered to be relevant for the building type, and provides the total national cost anticipated for that item across all buildings of that type. Where it is determined that a specific item is not applicable to all buildings, adjustments are made and identified in this section.
- **Estimated National Impact.** This section provides the total estimated impact for the specific building type.

This section concludes with a summary of the estimated total national impact for all studied building types.

II. ITEMS - ANALYSIS

The “items” analyzed in this section were identified by comparing the NPRM with each of the “baseline” documents addressed in the Introduction (See Part I). Where the NPRM provisions exceeded each of the baseline documents, it was then analyzed to determine if the provision could have a significant impact on covered facilities. Where it appeared that the NPRM provision could have a significant impact, that “item” was included in this section, and was analyzed to determine how the provision would be incorporated into the design of new facilities. The item was also studied from a cost estimating perspective, to determine if any additional costs would result from the NPRM provision. The narrative provided for each of the selected items explains any assumptions used, the factors considered in assessing the potential impact, and any relevant factors or issues that were not assessed due to the limitations of this assessment.

ITEM 1. Visual Alarm Notification Appliances in Employee Work Areas

NPRM Text and Summary of Issue

“203.3 Employee Work Areas. *Employee work areas* shall be designed and constructed so that individuals with disabilities can approach, enter, and exit the *employee work areas*. In addition, visual alarm coverage shall be provided where audible alarm coverage is provided in *employee work areas*. ...”

The addition of visual alarm requirements in employee work areas is a change from current ADAAG, which currently applies only the “approach, enter and exit” requirement to employee work areas. As noted in the NPRM preamble to this section, this would “require visual alarms in most work areas with a door”, and “is a change from current ADAAG, which requires visual alarms in common use and public use spaces, but not in those spaces that serve only as a work area.”

Under current model code and standard provisions, visual alarm notification appliances are required in “public and common areas” where a fire alarm system is provided. The general application of this requirement is that spaces such as conference rooms, corridors, toilet rooms, copy rooms, break rooms and kitchenette areas receive visual alarm coverage, as do open-plan office areas and large offices serving multiple persons. Under current ADAAG, open-plan work areas and multiple-person offices

would be exempt from visual alarm requirements, as they are employee work areas. Because these spaces are generally required to have visual alarms by building and fire codes, the impact of expanding visual alarm requirements to these spaces by the NPRM is not being considered.

Individual offices (typically ranging from 100 to 300 square feet in area), however, are not considered "common" areas, and do not receive visual alarms under typical application of current model codes and standards. Expanding visual alarm requirements to all these small individual work areas, as required by the NPRM, will significantly increase the number of visual alarm appliances in some facilities. This item focuses on the addition of visual alarm coverage in a single small office.

Cost Estimate Methodology

It is assumed that the "work areas" currently not receiving visual alarms are generally individual offices, with an average size of 200 square feet. For spaces not exceeding 20 feet in length or width, a 15 candela visual signal can be used. Costs include the following: appliance, mounting box, conduit and wiring. Installation is included in the appliance cost.

The addition of a single visual alarm appliance should have little or no cost impact on the overall fire alarm system. Standard industry practice in new construction is to design systems with circuits at approximately 80% of their capacity, allowing the addition of some appliances.

The addition of multiple visual alarm appliances will create a need for additional circuits, and additional power demands, for the overall fire alarm system. However, the addition of multiple visual alarm appliances will result in some reduction in the "per item" cost, where the placement of appliances and the location of conduit is coordinated for efficiency. These variables are addressed within the "typical" building analysis portion of this report.

Information for this item was developed with the input from a variety of alarm manufacturers, consultants, and contractors, fire protection engineers, and industry product/construction cost data.

Unit Cost: \$270.00

Installed cost of a single 15 candela visual alarm notification appliance
(Refer to appendix for detailed cost breakdown.)

ITEM 2: TTYs**NPRM Text and Summary of Issue**

“217.4.2.1 Public Buildings. Where at least one public pay telephone is provided on a floor of a *public building*, at least one public TTY shall be provided on that floor.”

“F217.4.2 Floor Requirement. Where at least one public pay telephone is provided on a floor of a *building*, at least one public TTY shall be provided on that floor.”

“F217.4.3 Building Requirement. Where at least one public pay telephone is provided in a *public use* area of a *building*, at least one public TTY shall be provided in the *building* in a *public use* area.”

The NPRM proposes a substantial increase in the required number of TTYs at public pay telephones. The proposed new scoping requirements for providing TTYs at banks of telephones, on a floor of a building, within buildings, and on a site are generally consistent with new provisions that have been incorporated into an appendix chapter of the *International Building Code* (IBC).

The NPRM does go beyond the IBC provisions for TTYs in “public buildings” (those covered by Title II) and for federal facilities as follows:

- Requires a TTY on a floor of a public (Title II) building if a single pay phone is provided on that floor (IBC doesn't require a TTY until four phones are provided);
- Requires a TTY on a floor of a federal facility if a single pay phone is provided on that floor (IBC doesn't require a TTY until four phones are provided);
- Requires a TTY in a “public use” area of a federal facility, if a single public pay phone is provided (IBC doesn't specifically address “public use” areas).

Cost Estimate Methodology

Costs have been estimated for permanent installation of a single TTY at a public pay telephone. Costs are based on a unit appropriate for installation in a public, high-use area. Installation is included in the cost of the TTY.

NOTE: Although this item has been included in this assessment, it does not appear in any of the “typical” building examples. These requirements apply only to certain areas of federal facilities and Title II “public buildings”. Although the building analysis portion of this assessment does include federal facilities (newly constructed US Postal Service customer service facilities — refer to Part III, “Typical” building 6), these facilities do not generally include public pay telephones.

Unit Cost: \$1,998.00
Installed cost of a single TTY at a public pay telephone
(Refer to appendix for detailed cost breakdown.)

ITEM 3: Two-Way Communication Systems

NPRM Text and Summary of Issue

“231.1 General. Where a two-way communication system is provided to gain admittance to a *building* or *facility* or to restricted areas within a *building* or *facility*, the system shall comply with 708.”

“708.1 General. Two-way communication systems required to be *accessible* shall comply with 708.

708.2 Audible and Visual Indicators. The system shall provide both visual and audible signals.”

Current ADAAG, UFAS, the *International Building Code*, and A117.1 do not address two-way communication systems, such as those that are used to identify and admit visitors to a building or a suite. This item is included because of the NPRM requirement that these types of systems provide both audible and visual signals. Most current systems rely on audible signals only.

Cost Estimate Methodology

It is assumed that a system will consist of a single interface at an exterior entrance, and a single unit in an interior location (such as a security desk or reception area). The system should allow visitors to “announce” their presence, and for a person at the interior location to both acknowledge receipt of the announcement and, if desired, to remotely admit the visitor. All three steps (announcement, acknowledgment, and unlocking) should include both audible and visual signals.

“Item” costs include only those additional costs associated with providing visual signals at each of the two system interfaces. Costs for the “typical” system, with its associated wiring and conduit, is not included.

Unit Cost: \$1,077.00
Additional cost for visual signals
on two-way communication system
(Refer to appendix for detailed cost breakdown.)

**ITEM 4: Dwelling Unit Accessible Communication Features:
Primary Entrance Notification (Doorbell)****NPRM Text and Summary of Issue**

“234.1.3 Communication Features. In residential *facilities*, at least two percent, but not less than one unit, of the total number of *dwelling units* in a *facility* shall comply with 1101 and 1103.

EXCEPTION: Where residential *facilities* contain four or less *dwelling units*, at least two percent, but not less than one unit, of the total number of *dwelling units* in the *project* shall comply with 1101 and 1103.”

“F234.1.3 Communication Features. In residential *facilities*, at least two percent, but not less than one unit, of the total number of *dwelling units* in a *facility* shall comply with 1101 and 1103.

EXCEPTION: Where residential *facilities* contain four or less *dwelling units*, at least two percent, but not less than one unit, of the total number of *dwelling units* in the *project* shall comply with 1101 and 1103.”

“1103.1 General. Dwelling units required to have *accessible* communication features shall comply with 1103.”

“1103.5 Dwelling Unit Primary Entrance. Communication features shall be provided at the *dwelling unit* primary entrance complying with 1103.5.

1103.5.1 Notification. A hard-wired electric doorbell shall be provided. A button or switch shall be provided outside the *dwelling unit* primary entrance. Activation of the button or switch shall initiate an audible tone and visible signal within the *dwelling unit*. Visible doorbell signals that are located in the sleeping areas shall have controls to deactivate the signal.”

The NPRM requires that at least two percent of covered dwelling units (in both ADA and ADA scoping documents) contain accessible communication features. Dwelling unit provisions of the NPRM generally do not apply to privately-owned multi-family housing.

The technical provisions in 1101 address four separate components: requirements for fire alarms and smoke detectors, requirements for doorbells (to identify arrival of visitors at the dwelling unit entrance), requirements for building or floor entry systems, and requirements for closed circuit communication systems.

Equivalent provisions for alarms are already contained in the *International Building Code* (IBC) and A117.1, therefore they are not addressed in this assessment. Closed circuit systems are not commonly used, or are used as a 2-way communication system; therefore, they are not addressed. Although A117.1 contains provisions identical to the NPRM for doorbells and for building or floor entry systems, the IBC does not include any scoping provisions; therefore, the provisions in A117.1 are not applicable. This item addresses doorbell requirements; Item 5 addresses entry communication systems.

Although the NPRM requires both audible and visual signals, there are no technical provisions included for these signals. A117.1-1998 requires only the audible signal; the intent was that by providing the electric doorbell with audible signal, the capability to add desired visual signals would be provided.

Cost Estimate Methodology

It is assumed that an electric doorbell, with a push-button at the unit exterior, and a single audible/visual indicator inside the unit, located near the unit entrance, will be used. Although the NPRM addresses visual signals (with switches to deactivate them) in sleeping areas, these are not required, and are therefore not included in this assessment. Cost includes audible/visual signal, pushbutton, transformer, and wiring.

Unit Cost: \$250.00

Installed cost of a single electric doorbell with audible/visual signal
(Refer to appendix for detailed cost breakdown.)

ITEM 5: Dwelling Unit Accessible Communication Features: Site/Building/Floor Entry Systems

NPRM Text and Summary of Issue

“234.1.3 Communication Features. In residential *facilities*, at least two percent, but not less than one unit, of the total number of *dwelling units* in a *facility* shall comply with 1101 and 1103.

EXCEPTION: Where residential *facilities* contain four or less *dwelling units*, at least two percent, but not less than one unit, of the total number of *dwelling units* in the *project* shall comply with 1101 and 1103.”

“F234.1.3 Communication Features. In residential *facilities*, at least two percent, but not less than one unit, of the total number of *dwelling units* in a *facility* shall comply with 1101 and 1103.

EXCEPTION: Where residential *facilities* contain four or less *dwelling units*, at least two percent, but not less than one unit, of the total number of *dwelling units* in the *project* shall comply with 1101 and 1103.”

“1103.1 General. Dwelling units required to have *accessible* communication features shall comply with 1103.”

1103.6 Site, Building or Floor Entrance. Where a system permitting voice communication between a visitor and the occupant of the *dwelling unit* is provided at a location other than the *dwelling unit* entry door, the system shall comply with 1103.6.

1103.6.1 Common Use or Public Use System Interface. The *common use* or *public use* system interface shall include the capability of supporting voice and

TTY communication with the *dwelling unit* interface.

1103.6.2 Dwelling Unit Interface. The *dwelling unit* system interface shall include a telephone jack capable of supporting voice and *TTY* communication with the *common use* or *public use* system interface.”

The NPRM requires that at least two percent of covered dwelling units (in both ADA and ADA scoping documents) contain accessible communication features. Dwelling unit provisions of the NPRM do not generally apply to privately-owned multi-family housing.

The technical provisions in 1101 address four separate components: requirements for fire alarms and smoke detectors, requirements for doorbells (to identify arrival of visitors at the dwelling unit entrance), requirements for building or floor entry systems, and requirements for closed circuit communication systems.

Provisions for alarms are already contained in the *International Building Code* (IBC) and A117.1, therefore they are not addressed in this assessment. Closed circuit systems are not commonly used, or are used as a 2-way communication system; therefore, they are not addressed. Although A117.1 contains provisions identical to the NPRM for doorbells and for building or floor entry systems, the IBC does not include any scoping provisions; therefore, the provisions in A117.1 are not applicable. This item addresses entry communication systems; Item 4 addresses doorbell requirements.

This provision in the NPRM does not require the installation of two-way communication systems at the site entry, building entry, or floor entry serving accessible dwelling units. Where systems are provided at these locations, the NPRM does require that both the public “interface” and the dwelling unit “interface” be capable of supporting TTY communication. This provision mirrors A117.1 provisions, which consistently require the “capability” for dwelling unit communication features to be made accessible.

The impact of this item is limited to any additional costs incurred by requiring the capability of both the public interface and the dwelling unit to support TTY communication.

Cost Estimate Methodology

It is assumed that a mid-range priced system is provided at the building entry, allowing voice communication with the dwelling unit, with the capability to remotely unlock the entry door from within the dwelling unit. For the public interface of the system, costs are incurred for additional wiring/jack to provide capability to support TTY. System selection is also assumed to be limited to a system that is capable of supporting TTY communication. The dwelling unit interface is assumed not to have any direct cost, as by selecting a system that can provide TTY communication, a TTY should be able to be added within the unit. It is assumed that providing a method of connecting a TTY to the dwelling unit interface (via handset or jack), and providing an electrical supply for a TTY (by locating an outlet appropriately), create not cost impact within a newly constructed unit.

Unit Cost: \$264.00

Additional Costs for TTY Capability on Site/Building/Floor Entry System
(Refer to appendix for detailed cost breakdown.)

ITEM 6: Accessible Operable Windows

NPRM Text and Summary of Issue

“230.1 Windows. Where glazed openings are provided in *accessible* rooms or *spaces* for operation by the occupants, at least one opening shall comply with 309. In *accessible* rooms or *spaces*, each glazed opening required by the *administrative authority* to be operable shall comply with 309.”

This NPRM provision exceeds the requirements of the *International Building Code* (IBC) and A117.1, which require accessible operable windows only in required accessible “Type A” dwelling units, accessible transient lodging guest rooms, and accessible patient/resident sleeping rooms in institutional occupancies. The NPRM expands this provision to cover operable windows in other occupancies, provided they are “for operation by the occupants”. Windows located within non-accessible dwelling units, non-accessible transient lodging guest rooms, and non-accessible patient/resident sleeping rooms are not affected by this requirement.

It is assumed that in most facilities subject to this expanded requirement, only some of the operable windows would be required to be accessible:

- Windows located within employee work areas would not be covered, because of the general exception for employee work areas.
- Some windows will not be considered to be for “operation by the occupants”.
- Only required operable windows, or a minimum of one operable window per room or space having operable windows, need be accessible.

The nature of this requirement would likely be a factor in deciding how to comply. In general, there are two primary methods to provide an accessible operable window: by providing a unit that already has hardware in an accessible location, such as a casement window (which may still require an extended crank handle), or to provide an add-on hardware set to a sliding or single/double hung unit. Casement units generally cost a significant premium (approximately \$325/unit before markups, assuming a companion fixed lite) over single/double hung or sliding units (approximately \$125, prior to markups, before adding accessible hardware). Where casements were used, it is likely that they would be used for the entire facility, to avoid a hodge-podge of window types and sizes on the building elevation. This increases the cost of all windows, including those not required to be accessible.

Where the more common, and more economical, sliding, single-hung or double-hung units are used, an “add-on” hardware package can be provided for those windows that are required to be accessible. Although the total cost of a single accessible window with the add-on hardware will exceed the cost of a single casement unit, the increased cost occurs only on a small percentage of operable windows, rather than on each operable window.

Cost Estimate Methodology

It is assumed that an “add-on” hardware package is provided on a typical sized sliding, single-hung, or double-hung window is provided. Costs include the hardware package and installation costs.

NOTE: Although this item has been included in this assessment, it does not appear in any of the “typical” building examples. Hotels and multi-family buildings are not affected by this provision, as only required accessible rooms must have accessible operable windows, which is consistent with the IBC. Operable windows are not typically provided in office buildings, cinemas, stadiums/arenas, or postal customer service facilities.

Unit Cost: \$364.00

Installed costs of accessible operating hardware on a single window.
(Refer to appendix for detailed cost breakdown.)

ITEM 7: Assembly Areas: “Equivalent” Vertical Access

NPRM Text and Summary of Issue

“221.5 Vertical Access. Where *wheelchair spaces* or designated aisle seats share a common *accessible route* that includes vertical access by means of elevators or platform lifts, elevators or platform lifts shall be provided in such number, capacity, and speed as to provide a level of service equivalent to that provided in the same seating area to patrons who can use stairs or other means of vertical access.”

This provision adds an additional requirement on the type, location and number of accessible routes that may be required in assembly occupancies. Current ADAAG requires only a single accessible route and two accessible means of egress. This provision will likely impact large facilities; smaller facilities will have a lower demand for elevators and lifts.

The current number of accessible vertical access routes provided tends to vary with the size and type of facility. In smaller assembly occupancies, such as movie theaters, the

current requirements of ADAAG do not generally require the use of lifts or elevators to provide accessible spaces within the theater auditorium. For minor league ballparks, elevators may be provided at a single location. In large arenas, multiple elevators are generally provided in several locations; however, often a large percentage are "restricted" to use by VIPs, press, or luxury suite users. In large stadiums, in addition to a multiple number of elevators (some of which are often "restricted" use), accessible ramps are generally provided. These ramps tend to be the primary means of exiting, including by persons using wheelchairs, upon conclusion of an event.

This provision is not anticipated to have a significant impact on the number or location of platform lifts; currently, they are generally used only where a small number of accessible spaces are being served. This provision will likely require an increase in the number of elevators required for all but the smallest sports facilities. The number of additional elevators will depend upon the size of the facility. It may be possible to reduce the impact of this provision by changing the "restricted" use of certain elevators already incorporated into these types of facilities; however, this administrative/operational issue is beyond the scope of this assessment.

Cost Estimate Methodology

It is assumed that this provision will require additional elevators for certain larger assembly occupancies. The "item" cost is based on the costs of a single elevator. It is assumed that the elevator will be a hydraulic, three stop, 3000 lb. capacity elevator. The total number of additional elevators will be addressed in the "typical" building and national aggregation analysis.

The NPRM provisions in items 7, 8, 9, and 10 will also have a cumulative effect in some assembly facilities; this is also addressed in the building and national portions of this assessment. The "item costs" for items 7-10 have been developed as a "kit of parts" which will be used in assessing the building/national impact.

Unit Cost: \$61,794.00
Installed costs of 3-stop hydraulic elevator
(Refer to appendix for detailed cost breakdown.)

ITEM 8: Assembly Areas: Dispersion of Wheelchair Spaces/Designated Aisle Seats

NPRM Text and Summary of Issue

“802.6 Dispersion of Accessible Seating. Where the number of seats exceeds 300, *wheelchair spaces* and designated aisle seats shall be dispersed to provide a choice of admission prices and viewing angles comparable to that provided to other spectators. Where the minimum number of required *wheelchair spaces* or designated aisle seats is not sufficient to allow for complete dispersion, *wheelchair spaces* or designated aisle seats shall be dispersed in the following priority: price level, horizontal dispersion and vertical dispersion.

802.6.1 Admission Prices. *Wheelchair spaces* and designated aisle seats shall be provided in each price level distinguishable by location.

802.6.2 Horizontal Dispersion. Wheelchair spaces and designated aisle seats shall be located to provide spectators in *accessible* seating with viewing angles generally representative of the horizontal viewing areas available to other spectators.

802.6.3 Vertical Dispersion. Wheelchair spaces and designated aisle seats shall be located at varying distances from the performance area on each *accessible* level and in each balcony or *mezzanine* that is located along an *accessible route*.”

The NPRM proposes more specific dispersion criteria, including specifying the prioritization for various dispersion factors. The admission price dispersion provision appears to more specifically mandate accessible aisle seats and wheelchair spaces in “each” price level “distinguishable by location.” The horizontal dispersion provision is assumed to have the least impact; where an accessible route has been provided, it is generally extended to the extent needed to disperse accessible spaces/seats horizontally. The vertical access dispersion provision appears to trigger additional dispersion than current practice by requiring accessible seats/spaces “at varying distances..on each accessible level...”. In most large sports facilities for example, wheelchair spaces tend to be grouped along one or two vertical points of each deck, particularly in upper decks which have a steep pitch.

Cost Estimate Methodology

It is assumed that a common method of achieving the dispersion requirements will be by the use of additional elevators or lifts to accommodate the dispersion for admission price and vertical dispersion. Elevator costs have been identified in Item 7. This item assesses the cost of adding a platform lift, which, for some facilities, could provide sufficient vertical dispersion, and possibly admission price dispersion, if located appropriately.

The NPRM provisions in items 7, 8, 9, and 10 will also have a cumulative effect in some assembly facilities; this is also addressed in the building and national portions of this assessment. The "item costs" for items 7-10 have been developed as a "kit of parts" which will be used in assessing the building/national impact.

Unit Cost: \$14,213.00
Installed costs of platform lift.
(Refer to appendix for detailed cost breakdown.)

ITEM 9: Assembly Areas: Wheelchair Space Companion Seats

NPRM Text and Summary of Issue

"221.3 Readily Removable Companion Seats. One readily removable companion seat complying with 802.7 shall be provided for each *wheelchair space*. Each required readily removable companion seat shall provide an additional *wheelchair space* complying with 802.1, 802.2, 802.3, 802.4, 802.5, and 802.9 when removed.

EXCEPTIONS: 1. Companion seats shall be permitted to be fixed and shall not be required to provide wheelchair spaces where the seating capacity is 300 or fewer. ..."

"802.7 Readily Removable Companion Seats. A readily removable companion seat shall be provided next to and in the same row as each required *wheelchair space*. Individuals seated in companion seats shall be seated shoulder-to-shoulder with the *wheelchair* user seated in the adjacent *space*."

In assembly facilities with more than 300 seats, the NPRM requires that companion seats be "readily removable", and more significantly, requires that each companion seat, with the seat removed, provide an additional wheelchair space. This will increase the size allocated for a companion seat, which currently matches the wheelchair space in front-to-back depth, but is typically the width of a regular seat (18-22").

General industry practice appears to already align the companion seat back with the back location of a wheelchair in the wheelchair space. Therefore, no cost impact is assumed for requiring the companion seat to be "shoulder-to-shoulder".

Cost Estimate Methodology

It is assumed that there is a cost to provide an anchoring method for the removable seat. The additional square footage required by increasing from a companion seat to a wheelchair space is also included as a "direct" cost. This is assumed to require an average 6 square foot area increase. All other elements remaining equal, this adds 6 square feet to the facility for each companion seat. For certain types of assembly occupancies, particularly larger sports arenas/stadiums, the increase in area of the

companion seat space will have a ripple effect, requiring additional accessible routes. In large stadiums (40-80,000 capacity), typical configurations already require a continuous horizontal "ring" of wheelchair spaces. This impact is assessed in the building/national impact portion of this assessment.

The NPRM provisions in items 7, 8, 9, and 10 will also have a cumulative effect in some assembly facilities; this is also addressed in the building and national portions of this assessment. The "item costs" for items 7-10 have been developed as a "kit of parts" which will be used in assessing the building/national impact.

Unit Cost: \$1,315.00

Increased Square footage costs, and anchoring for a removable companion seat.
(Refer to appendix for detailed cost breakdown.)

ITEM 10: Assembly Areas: Designated Aisle Seats on Accessible Route

NPRM Text and Summary of Issue

“221.4.1 Number. One designated aisle seat complying with 802.8 per 100 seats, or fraction thereof shall be provided.

221.4.2 Location. At least one of each four required designated aisle seats shall be located on an *accessible route*. All other required designated aisle seats shall be located not more than two rows from an *accessible route* serving such seats.”

Current ADAAG requires designated aisle seats in the same quantity as the NPRM, but does not address their location in relation to accessible routes. The NPRM will require that 1/4 of the required aisle seats be located on an accessible route, and that the rest be within two rows of an accessible route. General industry practice currently appears to be to locate designated aisle seats on, or as near to, accessible routes as permitted by the configuration. This NPRM provision will change this approach, and will require that accessible route locations be coordinated to accommodate the required designated aisle seats.

The impact of this proposed change will vary on the size and nature of the assembly occupancy. In large stadiums/arenas this will require additional accessible routes, and possibly affect standard seating bowl layouts, because current requirements for wheelchair spaces and companion seats generally "fill" the common continuous accessible ring.

Cost Estimate Methodology

It is assumed that there is no “direct cost” for this item. The same seat can be used as is typically used in current practice. However, this item will potentially require reconfiguration of assembly seating areas, to accommodate aisle seats on, and within two rows of, accessible routes. An average square footage cost for assembly occupancies is provided for this item, and will be incorporated into building/national impact assessment for large and small assembly occupancies.

The NPRM provisions in items 7, 8, 9, and 10 will also have a cumulative effect in some assembly facilities; this is also addressed in the building and national portions of this assessment. The “item costs” for items 7-10 have been developed as a “kit of parts” which will be used in assessing the building/national impact.

Unit Cost: \$204.00/Square foot
Average costs/square foot of assembly facility
(Refer to appendix for detailed cost breakdown.)

ITEM 11: Transient Lodging - Guest rooms - Visual Alarms

NPRM Text and Summary of Issue

“224.4 Communication Features. In *transient lodging facilities*, at least fifty percent, but not less than one, of the total number of guest rooms shall have accessible communication features complying with 806.3.”

“806.3 Communication Features. Guest rooms required to have *accessible* communication features shall comply with 806.3.

806.3.1 Alarms. Visual alarms complying with 702.3.6 shall be provided.”

“702.3.6 Guest Rooms. Guest rooms required to have visual alarms shall comply with 702.3.6.

702.3.6.1 Activation. Where single or multiple-station smoke detectors are provided in the sleeping room or suite, a visual alarm that is activated upon activation of the smoke detectors shall be provided within the room or suite. Where a building fire alarm system is provided, a visual alarm that is activated upon activation of the building fire alarm system shall be provided within the room or suite. The signaling line or channel between the activating device of the appliance and the building fire alarm system shall be monitored for integrity by the building fire alarm system. Where the same appliance is used for visual notification of smoke detector and fire alarm system activation, activation of the room or suite smoke detectors shall not activate the building fire alarm system.

702.3.6.2 Location. In sleeping rooms or suites, appliances shall be permanently installed at a location where alarm signals shall be visible, directly or by reflection, in all parts of the room or suite. In sleeping rooms the appliance shall be located 16 feet (4880 mm) maximum from the head end of the bed location,

measured horizontally. Where a suite contains more than one sleeping room, an appliance shall be provided in each sleeping room.

702.3.6.3 Minimum Effective Intensity and Mounting Height. Wall installed appliances located 24 inches (610 mm) minimum below the ceiling shall have a minimum effective intensity of 110 candela. Ceiling installed appliances and wall installed appliances located less than 24 inches (610 mm) below the ceiling shall have a minimum effective intensity of 177 candela.”

While current ADAAG allows the use of portable alarm devices or hard-wired devices in hotel guest rooms, the NPRM mandates permanent installations. This is consistent with the *International Building Code* (IBC) and A117.1. The NPRM increases the number of guest rooms required to be provided with visual alarms to 50% of the total number of rooms, from the current requirement of all accessible rooms (8% to 2% or less depending on total rooms) plus an additional percentage (8% to 2% or less, depending on total number of rooms). This exceeds the IBC provisions, which mirror current ADAAG.

The technical provisions required for the guest room visual alarms are consistent with A117.1 and NFPA 72. The just-completed 1999 edition of NFPA 72 will allow the interconnection of the building fire alarm system with the smoke detection system, so that a single visual alarm appliance can be used within the guest room.

Cost Estimate Methodology

It is assumed that a single 110 candela visual appliance will be used for guest rooms covered by this requirement. It is assumed that the fire alarm system is already extended into the guest room, and includes an audible appliance. To reduce the number of visual alarm appliances required, it is assumed that a single visual alarm appliance will be used for notification of both fire alarm activation in the building and smoke detector activation in the guest room. To accomplish this interconnection, it is assumed that a relay will be used at the interconnection between the systems. Costs include the appliance, relay, mounting box, conduit, and wiring. Installation is included in the appliance cost.

It is assumed that this approach is currently used by most newly constructed facilities, and that the current option for portable or “auxiliary” alarms is not generally used. Therefore, when calculating the impact of this item for the “typical” hotel and for the national impact, the current numbers of guest rooms required to have visual alarms will be subtracted from the new 50% total.

Unit Cost: \$293.00

Installed cost of a 110 candela visual alarm notification appliance in a guest room, connected to the fire alarm system and guest room smoke detector.

(Refer to appendix for detailed cost breakdown.)

ITEM 12: Transient Lodging - Guest rooms - Notification Devices**NPRM Text and Summary of Issue**

“224.4 Communication Features. In *transient lodging facilities*, at least fifty percent, but not less than one, of the total number of guest rooms shall have accessible communication features complying with 806.3.”

“806.3 Communication Features. Guest rooms required to have *accessible* communication features shall comply with 806.3.

806.3.2 Notification Devices. Visual notification devices shall be provided to alert room occupants of incoming telephone calls and a door knock or bell. Notification devices shall not be connected to visual alarm signal appliances. Permanently installed telephones shall have volume controls compatible with the telephone system and shall comply with 704.3. Permanently installed telephones shall be served by an electrical outlet complying with 309 located within 48 inches (1220 mm) of the telephone to facilitate the use of a *TTY*.”

“704.3 Volume Control Telephones. Public telephones required to have volume controls shall be equipped with a receive volume control that provides a gain adjustable up to a minimum of 20 dB. For incremental volume control, provide at least one intermediate step of 12 dB of gain. An automatic reset shall be provided.”

The NPRM proposes to increase the number of guestrooms required to be provided with accessible communication features, including notification devices, to 50% of the total number of rooms, from the current requirement of all accessible rooms (8% to 2% or less depending on total rooms) plus an additional percentage (8% to 2% or less, depending on total number of rooms). Requirements in the *International Building Code*, which are included in the appendix chapter on accessibility, are equivalent with current ADAAG.

The technical requirements for notification devices are essentially unchanged from current ADAAG.

Cost Estimate Methodology

It is assumed that the requirement for an electric outlet has no cost impact, as coordination of outlet layout in relation to telephone locations can eliminate the need for an additional outlet. It is also assumed that the typical new hotel telephone system includes a visual signal (which often doubles as a message light) and volume control on guest room phones. Any impact from the change in the specifications for volume control sound levels has not been considered.

For the “door knock” notification, it is assumed that an electric doorbell with a visual signal will be a common, cost-effective solution. Other solutions might include a sound activated light within the room, which would likely have an equivalent cost to the doorbell, but would actuated by any loud noise.

It is assumed that an electric doorbell, with a push-button at the guest room entry, and a single visual indicator near the room entry will be used. Cost estimate includes visual signal, pushbutton, transformer, and wiring.

Unit Cost: \$263.00

Installed cost of hard-wired electric doorbell with visual signal

(Refer to appendix for detailed cost breakdown.)

ITEM 13: Accessible Vending Machines

NPRM Text and Summary of Issue

“229.1 Depositories, Vending Machines, Change Machines and Mail Boxes. Where provided, at least one of each type of depository, vending machine, and change machine shall comply with 309.

EXCEPTION: Drive-up only depositories shall not be required to comply with this section.”

“F229.1 Depositories, Vending Machines, Change Machines and Mail Boxes. Where provided, at least one of each type of depository, vending machine, and change machine shall comply with 309.

EXCEPTION: Drive-up only depositories shall not be required to comply with this section.”

“309.3 Height. *Operable parts* shall be placed within one or more of the reach ranges specified in 308.

EXCEPTION: This requirement does not apply where the use of special equipment dictates otherwise or where electrical and communications systems receptacles are not normally intended for use by building or *facility* occupants.

309.4 Operation. *Operable parts* shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate *operable parts* shall be 5 lb (22.2 N) maximum.”

The NPRM provisions are consistent with similar requirements in the *International Building Code* (IBC) and A117.1, with the exception of vending machines. Vending machines are not generally addressed by A117.1 or by any building code. It is assumed that this requirement will apply to fixed or built-in vending machines, and not to the wide variety of vending machines and equipment that are essentially furnishings.

This item does not attempt to address the total cost of accessible vending machine; rather it identifies any additional cost incurred by requiring the machine to be accessible. To identify a specific, identifiable scope of equipment, this item focuses on the type of self-service vending equipment generally used by the U.S. Postal Service (USPS) in customer service facilities.

Cost Estimate Methodology

Based on information obtained from several general vending machine manufacturers and distributors, and information obtained from the USPS, there is not any direct cost impact by requiring this type of vending equipment to be accessible when dealing with new construction and new equipment. The USPS indicates that current practice requires all newly-ordered equipment to meet current ADA requirements. The requirements for all controls at 54" maximum above the floor, one-handed operation, and 5 lb. maximum force in the NPRM are all consistent with current ADAAG provisions for accessible controls and operating mechanisms.

Unit Cost: \$0.00

Additional cost for accessible vending equipment.

III. "TYPICAL" BUILDINGS - ANALYSIS

The "typical" building types were selected based on the items included in this assessment. This portion of the assessment illustrates the impact of the NPRM for these selected building types which are affected by the analyzed items.

This section does not address every building type covered by the NPRM, but rather provides a snapshot of some very common building types, and provides an estimate of the impact of the analyzed items on that building type.

BUILDING TYPE 1: Office Building

Typical Building Data

For purposes of this study, the "typical" newly constructed office building is assumed to be 200,000 square feet in area. Although the average building height is approximately 11 stories, for the items included in this assessment, the total building area is the only critical information.

Rationale/Source

The appropriate size for a typical office building was developed using information from the *1999 BOMA Experience Exchange Report*. This report contains information compiled from an annual survey done by the Building Owners and Managers Association (BOMA) International addressing operating income and expense data for office buildings in North America. The 1999 sample includes 3,514 U.S. private sector buildings, and 558 U.S. government office buildings.

In downtown markets, the average square footage was 410,000 for private buildings (of which 1,121 were surveyed); for government buildings (384 surveyed), the average square footage was 233,036. In suburban markets, the private sector buildings (2,393 surveyed) averaged 173,563 square feet; government buildings (174 surveyed) averaged 65,276 square feet.

Applicable Items

The *International Building Code* (IBC) requires fire alarm systems in any "Group B" occupancy having an occupant load of 500 or more persons (50,000 square feet) or more than 100 persons (10,000 square feet) above or below the lowest level of exit

discharge. For purposes of this assessment, it is assumed that this threshold will require fire alarm systems in all newly constructed office buildings.

ITEM 1: Visual Alarm Notification Appliances in Employee Work Areas

Estimates obtained from several industry sources indicate that, using current requirements, approximately 60-70% of the area of an office building receives visual alarm coverage. Including some allowance for mechanical spaces and other areas not required to receive visual alarms, this assessment assumes that the NPRM will require visual alarms to be provided for an additional 25% of building area. It is further assumed that this area is comprised of individual offices, each having an average size of 200 square feet.

Using these assumptions, the NPRM will require that an additional 250 visual alarm appliances be added to the office building. (50,000 square feet / 200 square feet office = 250 offices). It is assumed that the amount of conduit and wiring can be reduced by one-half, by locating appliances in adjacent offices back-to-back. In addition to the costs of the appliances, an allowance has been included (\$.10/square foot) to allow for additional power supply, amplifiers, backup power supply, and circuits for the additional appliances.

Total additional cost for visual alarms \$65,375.00

The cost of alarm systems complying with the baseline range from \$1.00 to \$1.50 per square foot. For the 200,000 square foot office building example used in the regulatory assessment, the cost would be \$225,000 using the middle of the range. Adding visual alarms to employee work areas, would represent a 29% increase in the cost of the alarm system over the baseline.

ITEM 3: Two-Way Communication Systems

While two-way communication systems are used in some office buildings, they are far less common than card-readers and similar access systems. This item is included as part of the typical building cost, but will be reduced in the national aggregation analysis for office buildings. It will be assumed that a two-way communication system is provided in twenty percent of the national total. (Note that systems may be provided at the building entrance, or at the entrance to a tenant space. In addition, some card-reader systems sometimes include a telephone handset, which would also trigger this requirement.)

Total cost for Communication System Visual Signals \$1,077.00

**TOTAL ADDITIONAL COST
FOR "TYPICAL" OFFICE BUILDING \$66,452.00**

Although construction costs vary greatly (ranging from \$85-\$175+/square foot), \$125/square foot, or a total construction cost of \$25,000,000, is an "average"

construction cost for a building of this size and type.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST \$66,452 X 100 / \$25,000,000 = 0.27%**

BUILDING TYPE 2: Hotel

Typical Building Data

It is assumed that a "typical" newly constructed hotel has 150 guest rooms, and is approximately 60,000 square feet in area.

Rationale/Source

The "typical" size facility was selected based on a review of 1998 data from the *Construction and Modernization Report*, published monthly by the American Hotel and Motel Association. For all of 1998, this report identifies a total of 179 new construction projects, which include a total of 27,286 new guest rooms (average 152 rooms/project). While this data does not represent a complete picture of new hotel construction, it does provide a reasonable cross-section of current industry trends. While some new projects include 400 or more rooms, the vast majority of new projects have a range of 100-200 rooms.

Applicable Items

ITEM 11: Transient Lodging - Guest rooms - visual alarms

Under current ADAAG, a hotel with 150 guest rooms is required to have 12 guest rooms with visual alarm coverage. The NPRM requires 50% of guest rooms, or 75 rooms in the 150 room hotel, to have visual alarm coverage. This adds an additional 63 rooms (75-12) with visual alarms to the "typical" new hotel

It is assumed that a single visual alarm appliance will be added to each of the 63 guest rooms, and that any additional power demands can be handled by the existing system design.

Total additional cost for guest room visual alarms \$18,459.00

ITEM 12: Transient Lodging - Guest rooms - notification devices

Under current ADAAG, a hotel with 150 guest rooms is required to have 12 guest rooms with visual notification devices. The NPRM requires 50% of guest rooms, or 75 rooms in the 150 room hotel, to have visual notification devices. This adds an additional 63 rooms (75-12) with visual notification devices to the "typical" new hotel

Total additional cost for guest room notification devices . \$16,569.00

**TOTAL ADDITIONAL COST
FOR "TYPICAL" HOTEL \$35,028.00**

Construction costs can vary widely, from as low as \$5,000,000 to more than \$30,000,000 depending on location, type, class of hotel, and other facilities provided. A typical smaller hotel, with minimal meeting facilities, a small fitness center and a restaurant would generally cost approximately \$8,000,000.00.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST $\$35,028 \times 100 / \$8,000,000 = 0.44\%$**

BUILDING TYPE 3: Multi-Family Building

Typical Building Data

For this building type, a "typical" unit is considered, rather than a typical building. Multi-family housing can consist of two units in a building, or a building containing 100 or more units. The "typical" dwelling unit is a two bedroom, two bath unit, of approximately 800-1000 square feet in area. The item costs will be adjusted in the national aggregation portion to account for the wide variation in building types for dwelling units.

Rationale/Source

"The State of the Nation's Housing 1999", published by the Joint Center for Housing Studies of Harvard University, indicates that 71% of new multi-family units have two bedrooms.

Applicable Items

ITEM 4: Dwelling Unit Communication Features: Doorbell

It is assumed that a doorbell with visual signals will be provided at each dwelling unit required to have accessible communication features.

Total additional cost for notification device (doorbell) \$250.00

ITEM 5: Dwelling Unit Communication Features: Site/Building/Floor Entry

This item applies to dwelling units located in buildings containing two-way communications systems between the dwelling unit and a control point. It is assumed that this type of system is provided in the "typical" unit. The national figure for this item will be reduced to allow for units without these systems.

Total additional cost for Two-way communication system . . . \$264.00

**TOTAL ADDITIONAL COST
FOR "TYPICAL" MULTI-FAMILY UNIT \$514.00**

Construction cost per multi-family unit can vary widely based on the location of the project, materials used, amenities provided, and size and construction type of the building. However, a reasonable "average" construction cost is around \$100,000/unit.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST $\$514 \times 100 / \$100,000 = 0.51\%$**

BUILDING TYPE 4: Assembly: Multiplex Cinema

Typical Building Data

The "typical" newly constructed multiplex cinema contains 16 screens in "stadium-style" seating configuration, with an average capacity of 200 persons per screen, and a total seating capacity of 3200. The building is approximately 60,000 square feet in area.

(Note: The impact of the NPRM on other types of assembly spaces with 300 or fewer seats should be similar to this "typical" building type.)

Rationale/Source

New facility information was obtained from the National Association of Theater Owners. "Typical" building represents a snapshot of current trends for an industry which added 8,000 screens in 1998, and expects to add 8,000-10,000 more in 1999.

Applicable Items

ITEM 7: Equivalent Vertical Access

This item is assumed not to impact cinema facilities. Because of the relatively small capacity of each auditorium (100-300 seats typically), and staggered starting times for films in various auditoriums, the "peak" traffic tends to be fairly limited. Current designs

generally provide a single point of entry to each auditorium. Existing accessible routes are assumed to provide adequate "equivalent" vertical access.

ITEM 8: Dispersion of Wheelchair Spaces/Designated Aisle Seats

Although the NPRM changes the requirements for dispersion of wheelchair spaces and designated aisle seats, it is assumed that this will have minimal impact on multiplex cinemas, because the dispersion requirements are not triggered where less than 300 seats are provided. The vast majority of auditoriums in newly constructed multiplex cinemas have less than 300 seats, and therefore are not affected.

ITEM 9: Wheelchair Space Companion Seats

The NPRM changes the requirements for wheelchair space companion seats, but only for assembly spaces with more than 300 seats. The vast majority of auditoriums in newly constructed multiplex cinemas have less than 300 seats, and therefore are not affected.

ITEM 10: Designated Aisle Seats on Accessible Route

Two designated aisle seats are required per auditorium, for a total of 32 in the 16-screen facility. It is assumed that this item creates no additional direct cost. In each auditorium, one of these aisle seats will be required to be on an accessible route; the other can be within two rows of an accessible route. It is assumed that this can be accommodated without requiring changes to the auditorium configuration.

TOTAL ADDITIONAL COST FOR "TYPICAL" MULTIPLEX CINEMA	\$0.00
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Although construction costs vary greatly (ranging from \$80-\$175+/square foot), \$130/square foot, or a total construction cost of \$7,800,000 for a 60,000 square foot facility is an "average" construction cost.

TOTAL ADDITIONAL COST AS A PERCENTAGE OF TOTAL CONSTRUCTION COST	0.0%
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BUILDING TYPE 5: Assembly: Stadium/Arena

Typical Building Data

This building type addresses stadiums and arenas for professional sports franchises and for major colleges and universities. Because of the wide variation of size and configuration of these facilities, they are addressed in three separate categories: large, medium, and small.

Large Stadium/Arena is assumed to be a facility for a Major League Baseball (MLB) or National Football League (NFL) team. MLB facilities currently being developed average 40,000-45,000 seats; NFL facilities range from 60,000-80,000 seats. For purposes of this assessment, it is assumed that the large stadium/arena has 50,000 seats.

Medium Stadium/Arena is assumed to be a facility for a National Hockey League (NHL) or National Basketball Association (NBA) team, or a combined NHL/NBA facility. New facilities in this category average 20,000 seats.

Small Stadium/Arena includes minor league baseball facilities and facilities for colleges and universities. It is assumed that the "typical" facility in this category includes 11,000 seats.

Rationale/Source

Information on recently completed facilities, and facilities planned for completion within three years was provided by *Stadium Insider*, a bi-weekly newsletter covering all aspects of stadiums and arenas, with a focus on financing, construction and development of new facilities. This information was used to develop estimated "average" size facilities in these three categories.

APPLICABLE ITEMS: LARGE STADIUM/ARENA

ITEM 7: Equivalent Vertical Access

It is assumed that three additional elevators will be required to provide "equivalent" vertical access to the number and capacity of stairs and ramps typically provided in these facilities.

Total additional cost for "equivalent" vertical access . . . \$185,382.00

ITEM 8: Dispersion of Wheelchair Spaces/Designated Aisle Seats

In order to accommodate the additional dispersion required by this item, it is assumed that an additional upper deck concourse will be required for the facility. These large facilities generally have a lower deck, a middle deck (with suites and/or club level amenities), and an upper deck. The steep slopes used in the upper deck make it impractical to accommodate accessible routes with more than a minimal change in level up or down from the vomitory access point within the seating bowl. The dispersion

requirement based on admission pricing, and the vertical dispersion requirement will generally require that a more substantial change in level be accommodated outside of the seating bowl for the upper deck area.

It is assumed that an additional concourse, of 50,000 square feet in area, will be used to provide access to the upper deck at an additional level. Other potential impact, including additional exiting requirements from the new level, and impact on the seating bowl and seating capacity due to additional vomitories, are not directly addressed.

Total additional cost for "dispersion" \$11,000,000.00

ITEM 9: Wheelchair Space Companion Seats

In a 50,000 seat facility, 501 wheelchair spaces and companion seats are required. It is assumed that this item creates no direct cost beyond the additional square footage and "removable" capability required for the companion seats. The dispersion requirement (addressed under item 8) provides accessible routes to two vertically-dispersed rows, which should be able to accommodate the increased size of the wheelchair space companion seats.

Total additional cost for companion seats \$661,320.00

ITEM 10: Designated Aisle Seats on Accessible Route

A total of 500 designated aisle seats are required. The NPRM requires that 150 of these seats be located on an accessible route, and that the remaining 350 be located within two rows of an accessible route.

It is assumed that this item has no direct cost impact, as the dispersion requirements (addressed under item 8) are assumed to provide additional accessible routes adequate to accommodate the designated aisle seats.

**TOTAL ADDITIONAL COST
FOR "TYPICAL" LARGE STADIUM/ARENA \$11,846,702.00**

Large stadium/arena can vary significantly in design and cost, with elements such as domes and retractable roofs on some new facilities greatly affecting total construction cost. For recent large stadiums/arenas, a construction cost of \$350,000,000.00 is an approximate average.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST . . \$11,846,702 X 100 / \$350,000,000 = 3.4%**

APPLICABLE ITEMS: MEDIUM STADIUM/ARENA

ITEM 7: Equivalent Vertical Access

It is assumed that two additional elevators will be required to provide "equivalent" vertical access to the number and capacity of stairs and ramps typically provided in these facilities.

Total additional cost for "equivalent" vertical access . . . \$123,588.00

ITEM 8: Dispersion of Wheelchair Spaces/Designated Aisle Seats

It is assumed that the requirements for dispersion based on admission price, and the requirement for vertical dispersion will add 4 lifts to the facility. Because these facilities are much smaller than the "large" facilities, the number of wheelchair spaces, companion seats, and designated aisle seats should be able to be accommodated without requiring an additional concourse. Other potential impact, such as impact on seating capacity where lifts are added, sightlines in areas where lifts are added, and profile changes required for the seating bowl, are not considered in the this assessment.

Total additional cost for "dispersion" \$56,852.00

ITEM 9: Wheelchair Space Companion Seats

In a 20,000 seat facility, 201 wheelchair spaces and companion seats are required. It is assumed that this item creates no direct cost beyond the additional square footage and "removable" capability required for the companion seats, as the dispersion requirements (addressed under item 8) are assumed to provide accessible routes to additional vertically-dispersed locations, which should be able to accommodate the increased size of the wheelchair space companion seats.

Total additional cost for companion seats \$265,320.00

ITEM 10: Designated Aisle Seats on Accessible Route

A total of 200 designated aisle seats are required. The NPRM requires that 50 of these seats be located on an accessible route, and that the remaining 150 be located within two rows of an accessible route.

It is assumed that this item will require additional space for accessible routes to accommodate the designated aisle seats. For a facility of this size, it is assumed that an additional 1500 square feet will be needed.

Total additional cost for aisle seats \$306,000.00

**TOTAL ADDITIONAL COST
FOR "TYPICAL" MEDIUM STADIUM/ARENA \$751,760.00**

\$200,000,000.00 is assumed to be an approximate average cost of a 20,000 seat stadium/arena. Construction costs can vary significantly, depending on location, facility use (single-or multiple-sports), and design.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST \$751,760 X 100 / \$200,000,000 = 0.38%**

APPLICABLE ITEMS: SMALL STADIUM/ARENA

ITEM 7: Equivalent Vertical Access

It is assumed that one additional elevator will be required to provide "equivalent" vertical access to the number and capacity of stairs typically provided in these facilities.

Total additional cost for "equivalent" vertical access \$61,794.00

ITEM 8: Dispersion of Wheelchair Spaces/Designated Aisle Seats

It is assumed that the requirements for dispersion based on admission price, and the requirement for vertical dispersion, will add 2 lifts to the facility. Because these facilities are much smaller than the "large" and "medium" facilities, the number of wheelchair spaces, companion seats, and designated aisle seats should be able to be accommodated without requiring an additional concourse. Other potential impact, such as impact on seating capacity where lifts are added, sightlines in areas where lifts are added, and profile changes required for the seating bowl, are not considered in the this assessment.

Total additional cost for "dispersion" \$28,426.00

ITEM 9: Wheelchair Space Companion Seats

In an 11,000 seat facility, 111 wheelchair spaces and companion seats are required. It is assumed that this item creates no direct cost beyond the additional square footage and "removable" capability required for the companion seats, as the dispersion requirements (addressed under item 8) are assumed to provide accessible routes to additional vertically-dispersed locations, which should be able to accommodate the increased size of the wheelchair space companion seats.

Total additional cost for companion seats \$146,520.00

ITEM 10: Designated Aisle Seats on Accessible Route

A total of 110 designated aisle seats are required. The NPRM requires that 28 of these seats be located on an accessible route, and that the remaining 82 be located within two rows of an accessible route.

It is assumed that this item will not have any direct cost impact. While the seating capacity of these facilities is significantly less than the "large" facilities, they are typically for the same sports, and have similar field-of-play perimeter dimensions. It is not as difficult to accommodate the number of wheelchair spaces, companion seats and designated aisle seats in these smaller facilities.

**TOTAL ADDITIONAL COST
FOR "TYPICAL" SMALL STADIUM/ARENA \$236,740.00**

Stadiums/arenas in this size category can have wide ranging construction costs, from as little as \$15-20 million to as much as \$150 million or more. It is assumed that \$50,000,000 represents the approximate "average" construction cost.

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST $\$236,740 \times 100 / \$50,000,000 = 0.47\%$**

BUILDING TYPE 6: Federal Facility - Postal

Typical Building Data

The "typical" newly constructed customer service facility owned by the United States Postal Service (USPS) is approximately 25,000 square feet in area. The "typical" newly constructed customer service facility leased by the United States Postal Service (USPS) is approximately 5,000 square feet in area.

Rationale/Source

Data provided by the USPS.

Applicable Items

None

**TOTAL ADDITIONAL COST
FOR "TYPICAL" FEDERAL FACILITY - POSTAL \$0.00**

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST 0.0%**

IV. NATIONAL AGGREGATION - ANALYSIS

BUILDING TYPE 1: Office Building

National Data.

It is estimated that 50,000,000 square feet of newly constructed office space will be completed during 1999. This is the equivalent of 250 of the "typical" 200,000 square foot office buildings addressed in the previous section.

Rationale/Source

The Market Intelligence Report, February 1999, published by BOMA International and Cushman & Wakefield, Inc. National office statistics for new office space for the year 1998 totaled 45,522,795 square feet. This total represents construction activity across 47 major markets, and is considered an accurate industry barometer. At year-end 1998, there was a total of 80,691,935 square feet under construction. Industry tracking indicates a continuing upturn in office building development for the next several years.

Applicable Items

Note: Item 3 is assumed to occur in 50 buildings, or 20% of the 250 buildings.

ITEM 1: Visual Alarm Notification Appliances in Employee Work Areas

250 Buildings X \$65,375 Item cost/bldg \$16,343,750.00

ITEM 3: Two-Way Communication Systems.

50 Buildings X \$1,077 Item cost/bldg. \$53,850.00

ESTIMATED NATIONAL IMPACT FOR OFFICE BUILDINGS

[Total of items 1 and 3] **\$ 16,397,600.00**

TOTAL ADDITIONAL COST AS A PERCENTAGE OF TOTAL CONSTRUCTION COST

(\$16,397,600 X 100) / (\$25,000,000 X 250 bldgs.) **0.26%**

BUILDING TYPE 2: Hotel

National Data.

It is assumed that 133,500 new guest rooms will be completed during 1999, the equivalent of 890 of the "typical" 150 room hotel.

Rationale/Source

The American Hotel and Motel Association *Lodging Industry Profile* provided the total number of guestrooms available at year-end 1997. Information on new supply, for 1998, and projections for new supply in the next few years, was obtained from the *Wall Street Transcript*, Special Focus: Lodging Industry, July 5, 1999 edition. Based on a supply of 3,800,000 million rooms at the end of 1997, new supply of 3.5% in 1998, and an estimated 3.4% new supply in 1999, it is assumed that 133,500 rooms will be added in 1999. This is the equivalent of 890 hotels with 150 guest rooms.

Applicable Items

ITEM 11: Transient Lodging - Guest rooms - visual alarms

890 Buildings X 18,459 Item cost/bldg. \$16,428,510.00

ITEM 12: Transient Lodging - Guest rooms - notification devices

890 Buildings X 16,569 Item cost/bldg. \$14,746,410.00

ESTIMATED NATIONAL IMPACT FOR HOTELS

890 Buildings X Typical bldg cost **\$ 31,174,920.00**

TOTAL ADDITIONAL COST AS A PERCENTAGE OF TOTAL CONSTRUCTION COST

$(\$31,174,920 \times 100) / (\$8,000,000 \times 890 \text{ bldgs.})$ **0.44%**

BUILDING TYPE 3: Multi-Family Building

National Data

It is estimated that a total of 800 new dwelling units will be required to provide accessible communication features, assuming that 40,000 new apartment units to be constructed in 1999 will be subject to this NPRM. The NPRM requires 2% of dwelling units to have accessible communication features. This NPRM requirement applies

on a per "project" basis; for purposes of this assessment, the 2% is applied to the total number of units estimated to be covered by the NPRM. Multi-family buildings and projects can range from two units in a single building to thousands of units in multiple buildings.

Rationale/Source

Information obtained from the National Multi-Housing Council indicates that a total of 420,586 new apartment units were completed during 1998. The US Census Bureau "Survey of Market Absorption" indicates that approximately 20,000 new federally subsidized apartments were completed during 1998. The same report indicates that over 6,000 "other" units were completed in 1998; this category includes "turnkey" projects built for, then sold to, public housing authorities, as well as continuing care units. This data does not cover all the types of units covered by the NPRM. Therefore, the estimated number of covered units has been increased to try to more completely reflect the scope of the NPRM. Accurate numbers as to the variety of newly constructed multi-family units that are covered by the ADA and ABA are not readily available.

Applicable Items / Adjustments

Note: It is estimated that 1/2 of the 800 dwelling units will contain a two-way communication system (item 5).

ITEM 4: Dwelling Unit: Primary Entrance Notification (Doorbell)

800 units X \$250 Item cost/unit \$200,000.00

ITEM 5: Dwelling Unit: Site/Building/Floor Entry Systems.

400 units X \$264 Item cost/unit \$105,600.00

ESTIMATED NATIONAL IMPACT FOR MULTI-FAMILY DWELLING UNITS

[Total of Items 4 and 5] **\$ 305,600.00**

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST**

(\$305,600 X 100) / (\$100,000 X 800 units) **0.38%**

BUILDING TYPE 4: Assembly: Multiplex Cinema

National Data

It is estimated that approximately 500 of the "typical" multiplex cinemas will be completed in 1999. This is comparable to 8000 screens, assuming the "typical" 16-screen facility.

Rationale/Source

Information obtained by the National Association of Theater Owners indicates that approximately 8000 screens were added in 1998. Projections for 1999 are for 8000-10,000 screens to be added. In new construction, new facilities average 16 screens.

Applicable Items

None applicable

ESTIMATED NATIONAL IMPACT FOR MULTIPLEX CINEMAS \$ 0.00

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST 0.0%**
[500 Buildings X \$7.8 million Typical Building Cost = \$3,900,000,000.00]

BUILDING TYPE 5: Assembly: Stadium/Arena

National Data

It is assumed that new stadiums/arenas are being completed annually in the following quantities: Large - 3, Medium - 5, Small - 5

Rationale/Source

Information on recently completed facilities, and facilities planned for completion within three years was provided by *Stadium Insider*, a bi-weekly newsletter covering all aspects of stadiums and arenas, with a focus on financing, construction and development of new facilities. This information was then compiled into the "average" size facilities in these three categories.

"Large": Major League Baseball: 1999 - 1 - 45,000 seats; 2000 - 4 - 38,000, 42,500, 42,000, 42,000 seats. National Football League: 1999 - 2 - 70,000, 56,000 seats; 2000 - 1 - 66,000 seats.

"Medium": National Basketball Association: 1999 - 3 - 20,000 seats each. National Hockey League: 1999 - 2 - 20,300, 21,000 seats; 2000 - 2 - 20,000, 18,500 seats. NBA/NHL Combined: 1999 - 3 - 22,500, 20,000, 20,000 seats. Major League Soccer: 1999 - 1 - 25,000 seats.

"Small": Minor League Baseball: 1999 - 2 - 13,000, 10,000 seats; 2000 - 5 - 6,000, 14,000, 10,000, 12,000, 8,000 seats. Colleges/Universities: 1999 - 2 - 9,000, 14,000 seats; 2000 - 2 - 5,000, 10,100 seats.

Applicable Items**ITEM 7: Equivalent Vertical Access**

3 Large X \$185,382 Item cost/bldg..	\$556,146.00
5 Medium X \$123,588 Item cost/bldg..	\$617,940.00
5 Small X \$61,794 Item cost/bldg..	\$308,970.00
Item Total for Stadiums/Arenas:	\$1,483,056.00

ITEM 8: Dispersion of Wheelchair Spaces/Designated Aisle Seats

3 Large X \$11,000,000 Item cost/bldg..	\$33,000,000.00
5 Medium X \$56,852 Item cost/bldg..	\$284,260.00
5 Small X \$28,426 Item cost/bldg..	\$142,130.00
Item Total for Stadiums/Arenas:	\$33,426,390.00

ITEM 9: Wheelchair Space Companion Seats

3 Large X \$661,320 Item cost/bldg..	\$1,983,960.00
5 Medium X \$265,320 Item cost/bldg..	\$1,326,600.00
5 Small X \$146,520 Item cost/bldg..	\$732,600.00
Item Total for Stadiums/Arenas:	\$4,043,160.00

ITEM 10: Designated Aisle Seats on Accessible Route

5 Medium X \$306,000 Item cost/bldg..	\$1,530,000.00
Item Total for Stadiums/Arenas:	\$1,530,000.00

ESTIMATED NATIONAL IMPACT FOR STADIUMS/ARENAS

[3 Large X 11,846,702 Typ. Building Cost = \$35,540,106.00]	
[5 Medium X \$751,760 Typ. Building Cost = \$3,758,800.00]	
[5 Small X \$236,740 Typ. Building Cost = \$1,183,700.00]	\$ 40,482,606.00

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST**

[Large: \$35,540,106 X 100 / \$350,000,000 x 3 bldgs = 3.4%]	
[Medium: \$3,758,800 X 100 / \$200,000,000 x 5 bldgs = 0.38%]	
[Small: \$1,183,700 X 100 / \$50,000,000 X 5 bldgs = 0.47%]	
Total: \$40,482,606 X 100 / 2,300,000,000 =	1.76%

BUILDING TYPE 6: Federal Facility - Postal

National Data

The United States Postal Service anticipates completion of 203 new USPS-owned customer service facilities, and 339 new USPS-leased customer service facilities in Fiscal Year 2000.

Rationale/Source

Data provided by the United States Postal Service.

Applicable Items

None

Estimated National Impact for Owned Postal Facilities \$.00
(203 Buildings + 339 facilities) X Typical Building Cost

NATIONAL AGGREGATION - TOTALS

Estimated Cost Impact

OFFICE BUILDING	\$16,397,600.00
HOTEL	\$31,174,920.00
MULTI-FAMILY HOUSING	\$305,600.00
MULTIPLEX CINEMA	\$0.00
STADIUM/ARENA	\$40,482,606.00
FEDERAL FACILITY - POSTAL	\$0.00

TOTAL NATIONAL IMPACT FOR ALL BUILDING TYPES \$88,360,726.00

**TOTAL ADDITIONAL COST AS A PERCENTAGE OF
TOTAL CONSTRUCTION COST**

Total construction cost of all building types = \$16,140,000,000

$\$88,360,726 \times 100 / \$16,140,000,000 = \dots\dots\dots 0.55\%$