



State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Administrative Services

KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management

DAVID G. BUXTON
Director

ADDENDUM NO. 2

Date: May 7, 2009

To: Contractors

From: Rick James, Project Manager, DFCM

Reference: Audio Visual Integration – Utah Museum of Natural History
University of Utah
DFCM Project No. 02243750

Subject: **Addendum No. 2**

Pages	Addendum Cover Sheet	1 page
	Revised Project Schedule	1 page
	<u>Exhibit Designer Addendum</u>	<u>36 pages</u>
	Total	38 pages

Note: *This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.*

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

2.1 SCHEDULE CHANGES: See attached revised project schedule.

2.2 GENERAL ITEMS: See attached Exhibit Designer Addendum.

**MULTI-STEP PROJECT SCHEDULE – REVISED
PER ADDENDUM NO. 2 DATED MAY 7, 2009**

PROJECT NAME:		AUDIO VISUAL INTEGRATION - UTAH MUSEUM OF NATURAL HISTORY UNIVERSITY OF UTAH – SALT LAKE CITY, UTAH		
DFCM PROJECT NO. :		02243750		
Event	Day	Date	Time	Place
Document Available, including Plans and Specifications	Wednesday	April 15, 2009	2:00 PM	DFCM 4110 State Office Building SLC, UT and DFCM web site*
Non-Mandatory Pre-Submittal Audio Conference Meeting	Monday	April 20, 2009	10:00 AM	Call: 308-344-6400 Enter Meeting Number: 824220#
Last Day to Submit Questions on Shortlisting (In Writing)	Thursday	April 23, 2009	4:00 PM	Rick James - DFCM E-mail: rjames@utah.gov Fax: 801-538-3267
Addendum on Shortlisting	Monday	April 27, 2009	2:00 PM	DFCM web site*
List of References, Statement of Qualifications, Project Management Plan, and Termination/Debarment Certification Due	Thursday	April 30, 2009	12:00 NOON	DFCM 4110 State Office Building SLC, UT
Interviews by Selection Committee (if necessary)	Wednesday	May 6, 2009	8:00 AM	To Be Announced
Short-List Announced	Monday	May 11, 2009	2:00 PM	DFCM web site*
Notice: Only Short-Listed Firms Will Be Allowed To Bid On This Project				
Last Day to Submit Questions (In Writing)	Thursday	May 14, 2009	12:00 NOON	Rick James - DFCM E-mail: rjames@utah.gov Fax: 801-538-3267
Final Addendum (exception for bid delays)	Tuesday	May 19, 2009	4:00 PM	DFCM web site*
Prime Contractors Turn in Bid and Bid Bond/Bid Opening in DFCM Conference Room	Wednesday	May 27, 2009	3:00 PM	DFCM 4110 State Office Building SLC, UT
Subcontractors List Due	Thursday	May 28, 2009	3:00 PM	DFCM 4110 State Office Building SLC, UT Fax (801)-538-3677
Project Completion Date	Friday	December 31, 2010		

* DFCM's web site address is <http://dfcm.utah.gov>

Addendum #2
May 5, 2009

Changes made:

Weather Station SK3.E01.av01

Time-Science Weather Cam now OFE. AVI to install
Delete split screen programming. All programming now in media scope
Add trackball.

Generational Memory NV5.E06.av01

Delete speakers
Add 4 handsets.

Language Station NV3.E01.av01

Change monitor to touchscreen
Delete Keyboard

Human Interactions LF6.E05.av01

Delete pushbuttons/capacitive sensors
Add optical "hook switches"

B+R Biogeography LD4.E08.av01

Delete SD Video Playback
Change to Computer interactive

Mapping Interactive FP2.E01.av01

Add exhibit. Lighting control only

Central Dimmer

Change dimmer rack to provided and installed by GC.
AVI still responsible for providing controls & programming

Labs

Increase qty of speaker in Naturalist Labs from 4 to 8

SECTION 11130 AUDIO-VISUAL SYSTEMS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

- A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications of the Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

- A. Scope of Work

1. The range of audio visual technologies used include experiences based on simple media playback such as immersive audio environments, audio cues within mechanically interactive exhibits, a number of LCD screens and video projections in varying formats. Other exhibits involve larger video projections with touch activated interfaces to content. Additionally there are a number of interactive audio visual based 'trails' through the exhibits. These experiences are based on site specific interactive content that is accessed by handheld devices including the visitor's own smart phones through the University's wireless broadband Ethernet.
2. Furnish and install audio-visual systems as shown on the project drawings and described in this specification. The drawings and specifications do not describe all work required to fulfill the contract. In addition, provide any additional equipment, materials and labor required to make complete and working systems consistent with the intent embodied in the project drawings and specifications
3. Prepare shop drawings and other submittals for review by the exhibit design team prior to construction.
4. Provide all necessary connectors, terminals, punch blocks, patch bays, connector panels, and cover
5. Provide all necessary conduit, surface raceway, boxes, wire and fiber except those items specifically listed as work by others.
6. Provide all equipment required to meet the performance requirements defined in the AV design documents.
7. Coordination
 - (a) The Av Systems integrator will be required to work with University of Utah and existing service providers to insure that exhibits and wireless technologies work within the operating parameters and standards of the University's campus IT department (NetCom).
 - (b) All AV hardware that is built into millwork and graphics must be provided to the exhibit contractor for measurement and integration into exhibit housings and other surrounds. Shipment and delivery of this hardware should be coordinated with the Exhibit Contractor.

- (c) The AV Systems Integrator is responsible for coordinating equipment requirements including native file formats for playback with the media producers. It may be necessary to conduct online tests of optimal file formats and compression formats prior to installation of media content on site.
 - (d) The AV Systems Integrator will be responsible for coordinating with the work of the Exhibit Contractor and the General Contractor's MEP and IT Subcontractors to insure that all systems are properly integrated into the base building's IT, electrical and mechanical infrastructure. Terminate of all wiring at panels, terminal closets and equipment racks. Test all installed cabling and equipment.
8. Provide for shipping sample equipment to Exhibit Contractor s & media producers as required.
 9. Prepare all as built documentation
 10. Provide on-site training in the operation and maintenance of the systems for personnel designated by the museum
 11. Provide on-site support for opening week events.
 12. Provide a one-year warranty covering all systems installed under this specification

2)

B. Related Work

1. Division 16: Conduit, raceway and standard electrical boxes shall be provided by General Contractor. All 120 VAC circuits for A/V, teleconferencing, and network devices. Installation of AV Integrator provided dimmer racks.
2. CAT5 and fiber optic cables, jacks and patch bays for connection of AV systems to building LAN. Exhibit specific CAT and fiber optic cables are included in AV integrators scope.

1.01 REFERENCES

A. Codes

1. Federal, state, and local codes and requirements.
2. Code compliance is mandatory. Inform the owner if work is shown that appears to conflict with codes.

B. Standards:

1. CSA, UL or other nationally recognized testing laboratory standards.

1.02 SYSTEM DESCRIPTION

- A. General: Provide audio-visual systems for sound playback, video projection, computer graphics display, and AV interactive elements
- B. The system consists of the exhibits listed in the following chart;

Exhibit Name	Ref	notes
CANYON		
Trail Head	CN4.E01.av01-06	(6x) 17" touchscreen, CPU , 1 CPU & laser printer in gift shop
Trail System	N/A	Server for Trail System
SKY		
Demo Area	SK.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Weather Station	SK3.E01.av01	46" monitor,CPU (Instrument N.I.C.),trackball
Snowflake Video	SK3.E01.av02	Install OFE weather cam. 20" AV monitor, S-Def
NATIVE VOICES		
Demo Area	NV.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Storytelling Generational Memory	NV6.E01.av01-04	MP3 w/ focused spkr (4) caption reader
Welcome Language Station	NV5.E06.av01 NV1.E01.av01 NV3.E01.av01	(5) frameless 42" Displays S-Def, (4) handsets MP3 player, speaker, motion sensor CPU, 17" touchscreen, mic, headphones
LIFE		
Demo Area	LF.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Keritan Interactive	LF2.E02	(24) 2" 5x7 LED displays & electronics
What Cells Can Do Populations Interactive	LF3.E02.av01 LF5.E02.av01	Video projector, S-Def, focused spkr Touch interactive
Ecosystems Human Interactions	LF6.E01-E04.av01 LF6.E05.av01	(4x) 4 Sprk. Soundscape 4) handsets w/ optical hook switch to trigger sounds
Talkback Station	LF6.E05.av02	CPU, 17" monitor w/ kbd station
THE LAND		
Demo Area	LD.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Plate Tectonics	LD1.E03.av01	Globe on/off control only Allowance for 32" Omni Globe+software
B&R Biogeography	LD4.E08.av01	26" LCD, CPU, Buttons
Talkback Station	LD4.E04.av01	CPU, 17" monitor, still cam
Jump Seismometer	LD4.E03.av01	CPU, 15" monitor, local

FIRST PEOPLES

Demo Area	FP.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Mapping	FP2.E01.ino1	Lighting control only.
Ceramics, Tools, Weaving	FP5.E02.av01 FP5.E05.av01 FP5.E06.av01	(3x) 20" AV monitor S-Def w/ sound
Tool Interactive	FP5.E06.in01	Triggered Audio

LAKE

Demo Area	LK.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Sounds of the Lake	LK2.E01.av01	(8) speaker soundscape
Watershed	LK2.E06.av01	46" AV Monitor, S-Def, speakers, Cap Snsr
People and the Lake	LK2.E05.av01	46" AV Monitor, S-Def, speakers, Cap Snsr

PAST WORLDS

Demo Area	PW.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Pleistocene Dinner Table	PW2.E04.av01	Triggered Audio (x5)
Paleo Prep	PW7.E01.av01	20" AV monitor, S-Def, w/ sound
Cleveland Lloyd Quarry	PW5.E03.av01	(4) 32" AV monitor, S-Def, w/ sound
Late Cretaceous	PW4.E01.av01	(6) speaker soundscape

UTAH FUTURE

Sustainability (basic)	UF3.E01.av01	single 10K LCD, CPU, 15 gobo & sensor
UF Talkback Station2	UF3.E01.av02	CPU, 12" monitor spkrs, microphone, repeat monitor

OUR BACKYARD

Our Backyard Animal Sounds	OB2.E01.av01	(5x) MP3 players & speakers + 5 spkrs, 2 tracks in trees
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Labs

	PW8.av01 FP3.av01 LF7.av01	(3x) Ceiling Spkrs, Laptop Iface, Controls, Proj,W/L mic, floating ALS
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History Now	HV.AV01-AV03	(3x) 20" monitor, CPU, KBD, Trkball
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Mockup Allowance

Central Exhibit Dimmer & Control		Dimmer controls only, dimmer by GC
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- C. Systems includes KVM switch to monitor all computers in rack room
- D. System includes video multiplexor for monitoring video playback in rack room
- E. Many exhibits have motion sensors covering area in front of exhibit to trigger the start of the show. Selecting, providing, installing and wiring a motion sensor is in this scope.
- F. Many exhibits have hidden docent pushbutton switches to start and stop specific exhibits. Providing, installing and wiring this momentary switch is in this scope as required
- G. Projection exhibits may have dual projectors for back-up. There is no intention to run both projectors at the same time so pixel resolution alignment is not required.

1.03 SUBMITTALS

A. Submittals Required Prior to Fabrication:

1. Provide 3 copies of all submittals and allow a minimum of 14 days for review.
2. Submittal shop drawings to include the following
 - (a) Functional block diagrams for the audio, video, room control, and network/telecom systems. Label all inputs and outputs.
 - (b) Rack, frame and backboard elevations for all systems.
 - (c) Audio, video and network patch panels.
 - (d) Detailed riser diagram.
 - (e) Panel details showing all engraving for all systems.
 - (f) Schematics of all custom circuits.
 - (g) Detail any modifications to equipment supplied by manufacturers.
 - (h) Screen images of the audio processor programs showing blocks and all control pages, and a listing of statistics from the compiler showing board, processor and net utilization if applicable.
 - (i) Chart or other documentation of exhibit programming functionality. This should document:
 1. How the exhibit operates on the floor
 2. How the exhibit is turned on & off
 3. Any staff controls for test/debug

B) Prototyping:

1. General Some larger exhibits will require a level of full-scale prototyping in coordination with exhibit contractor and media producers. It is assumed that the AV Systems Integrator will provide staging, equipment and facilities for these working prototypes for designer and owner review prior to full implementation Specific exhibits requiring mockup

Populations Interactive	LF5.E02.av01
Sustainability Interactive	UF3.E01.av01

2. Prior to final fabrication and installation of all interactives shall be prototyped and tested by the Exhibit Contractor and reviewed by Exhibit Designer and Owner.
3. Fabrication schedule should be planned so that a minimum four weeks are allowed for prototyping testing and review prior to installation.
4. Notify Exhibit Designer one month in advance of dates and times when prototype will be fabricated and ready for review.
5. Prototypes shall demonstrate the aesthetic effects and functional qualities of materials and systems as well as the defined visitor experience, ergonomics and mechanical functioning of all interactives
6. Mock-up will take place in the AV Integrators shop.
7. Build mockups and prototypes to comply with the following requirements, using materials and products indicated for the completed Work to demonstrate the following:
 - functionality
 - accessibility, ergonomics and ease of use
 - integration of hardware, products and systems
 - durability

C. On completion of the Installation:

1. Submit written notification to the Owner of completion of initial tests, and coordinate checkout schedule.
2. Submit as-built drawings, to include:
 - a. Functional block diagrams for the audio, video, room control, and network/telecom systems. Label all inputs and outputs
 - b. Rack, frame and backboard elevations for all systems.
 - c. Audio, video and network patch panels
 - d. Wire lists for all systems, assigning wire numbers for every wire
 - e. Schematic of all custom circuits.
 - f. Detail any modifications to equipment

- g. Submit System Operation and Maintenance Manuals as specified in Section 01730, to include:
- h. All manufacturers' manuals. In a narrative section illustrated as necessary, describe the typical procedures to be followed in configuring and operating the systems. This manual should be written for a technically literate reader who is not an expert.
- i. A programmer's manual, intended to guide an experienced programmer through the custom software, with appropriate references to manufacturer's manuals.
- j. A maintenance manual, describing programmed maintenance procedures with appropriate references to manufacturer's manuals.
- k. A troubleshooting guide.
- l. A summary in tabular form of the operating settings of all adjustable components

1.04 QUALITY ASSURANCES

- A. The fabricator and the installer shall be one of the same firm who can substantiate that the firm has been continuously engaged in the fabrication and installation of museum audio-visual work similar in scope and scale to that described herein for not less than seven (7) years.
- B. Contractor must identify name and experience and contact information for the project manager and lead programmer who will remain on this project from initiation to completion. Lead programmer must be on contractor's permanent staff and not a subcontractor.

1.05 OTHER GENERAL REQUIREMENTS

- A. Field Cooperation: Cooperate at all times with all trades doing work on site to minimize lost time, work stoppages and interference.
- B. Store all material until it can safely be installed on site. Coordinate delivery times, storage and protection of the equipment at the site, and acceptance with the Owner

1.06 WARRANTY

- A. Provide a 1 year warranty on the installed systems. Warranty period shall begin on acceptance of the system by the Owner.
- B. Warranty shall cover labor and materials required to keep systems functioning as they were at the time of acceptance. Consumables such as projector lamps are not covered by the warranty. Damage or loss due to improper operation of the equipment, fire, flood, earthquake or theft shall not be covered by the warranty.

- C. During the warranty period, inspect the system annually and restore all equipment to original performance.

Part-2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new and shall meet or exceed the latest published specifications of the manufacturer in all respects.
- B. Supply the latest model of each piece of specified equipment available at the time of bidding. In the event that models are superseded between bidding and ordering of equipment, notify the Owner and provide the latest model with equal or superior specifications if the cost does not exceed that of the equipment as bid. If the cost of the newer piece exceeds the bid amount the Owner may elect to purchase the newer piece as a change order at additional cost.

2.02 SOFTWARE

- A. Show control software will be the responsibility of the contractor. Show control software will operate exhibits as described in media briefs. In addition software will provide for:
- Scheduled system on/off following museum operation hours
 - Manual override of schedule for events
 - Global volume controls
 - System status reporting via graphical “map” of exhibit
 - Any Code mandated fire shutdown.
- B. Media software will be the responsibility of Media Producer.
- C. Contractor will be responsible for setting up any computers supplied by contractor so they will auto boot with no login to the operating system.

2.03 CUSTOM FABRICATION

- A. Unless otherwise specified, custom plates shall be 1/8” brushed aluminum with beveled edges. Labels shall be engraved and paint filled. Anodized finish and infill colors to be approved by Owner.
- B. Adopt either EIA 568-A or –B wiring standard for Cat-5 cable to coordinate with data/telecom contractor.
- C. Avoid use of mini-din connectors for S-video on custom plates. Use dual 75 ohm BNC on plate and adapters at equipment.

- D. Equipment mounted in racks shall be labeled
- E. Seismic safety: Attach all permanently installed equipment to the building to minimize risks to personnel and the equipment in the event of earthquake. Brace all hanging equipment appropriately. Obtain the services of an appropriately licensed engineer for design of attachments and mounts where required by codes or prudent practice.
- F. All custom fabricated circuits employing integrated circuits and/or discrete components will be built using custom printed circuit boards. Wire wrap or soldered construction on prototyping boards is not acceptable. Exception: Pads and other simple networks that can be built into connector bodies or barrels.

PART 3 EQUIPMENT SCHEDULE

3.1 OVERALL SYSTEMS

1. Show Control

- a. Acceptable systems; Crestron / AMX / MSC, Alcorn-Mcbride
- b. All exhibits will be under control of a master show control system. Contractor will provide system meeting the following design criteria.
- c. System will be modular. No more than (3) exhibits will be connected to a single controller element to prevent single point failure from affecting other exhibits. Units will be networked to allow for overall monitor system however removal of monitor system will not affect exhibit operation.
- d. System will provide an overall status monitor to show the status of:
 - The whole museum (on graphical floor plan)
 - Individual exhibits
 - Individual pieces of equipment.
- e. System shall be programmable to achieve all functionality in specification including
 - Master on/off via schedule and buttons with override.
 - Global Volume Control
 - Specific exhibit functionality & monitoring

2. Master Audio Control

- a. Acceptable systems Media Matrix, BSS, MSC

- b. All audio signals will run through the master audio system. Contractor will provide system meeting the following design criteria.
- c. System will be DSP based.
- d. System will be modular. No more than (3) exhibits will be connected to a single controller. Single point failure will not affect other exhibits
- e. All inputs and outputs will be balanced.
- f. Each output channel will have volume control, 5 band parametric EQ, delay and limiting functions. Each inputs will have 5 band parametric EQ, limiting and matrix mixing capabilities.

3. Computers

- a. Computers will be commercial grade major manufacturer PC's with the following minimum features
- Intel Core 2 duo processor > 3Ghz
 - 2Gb Ram, 80GB hard drive, DVD-ROM drive
 - NVidia Quadro video card.
 - Vista Operating system

4. Media Players

1. At bid time this project is based on Standard Definition playback. The project is aware of the transition to HD and this may be revisited however for the purpose of this bid each video playback will include:
- a. Standard Definition Media player with solid state memory with demonstrated record of at least 3 years operation in a museum environment
- b. Simultaneous Y/U/V and composite outputs (or DA to achieve this functionality)
- c. Cable for future HD upgrade including one Cat5/6 low skew cable and one HD-SDI (SMPTE-292) coax.

3.2 SPECIFIC EXHIBITS

1.CANYON

Trail Head (6) computer interactives + gift shop printer)
CN4.E01.av01-06

- | | |
|---------------------------|---|
| 7) 17" Touch Monitors | ELO 1739L |
| 7) Computers | HP/Dell Pentium (see computer spec above) |
| 6) Cat-5 Extender | TBD/ Magenta |
| 1) Printer (in gift shop) | HP P4014N |

Trail System *Server for Smart Phone System*

- 1) Server 3GH Intel Quad core, Raid 5, (8) 146GB 15Krpm drives
Dual gigabit connection
- 1) 15" monitor
- 1) UPS 2200VA rack mount

2.SKY

Weather Station *Weather display*
SK3.E01.av01

- 1) 46" Monitor NEC 4620
- 1) Computers HP/Dell Pentium
- 1) Cat-5 Extender TBD/ Magenta
- 1) Interface to owners weather inst. TBD

The following are now OFE and installed by AVI

- 1) Sky Cam 5mp @15mps camera TimeScience
- 1) CPU and software for time-lapse rec.

Snowflake Video *Video playback w/sound, linear media*
SK3.E01.av02

- 1) 20" LCD flat panels ToteVision LCD-2007HDL
- 1) SD Media Players Alcorn DVM \ P
(see general notes above) DoReMi Nugget
- a/r Master Show Control
- a/r Master Audio Control

3.NATIVE VOICES

Storytelling *Audio playback w/4 Caption readers.*
NV6.E01.av01-04

- 1) Speaker Dakota FA-501
- 1) MP3 playback Alcorn 8-TraXX or 4MP3
- 4) Caption Displays Densitron LM4790+custom electronics
- 4) electronic drivers for above Custom
- 1) Docent Switch / Sensor Custom key switch
- a/r Master Show Control
- a/r Master Audio Control

Generational Memory
NV5.E06.av01

5 seamless plasma, 5 ch synch SD playback
Portrait orientation

- | | |
|--|---------------------------------|
| 5) 42" seamless plasma | Akira/Orion MIS 4220 |
| 1) SD Media Players
(see general notes above) | Alcorn DVM \ P
DoReMi Nugget |
| 4) Small handsets (mushroom shaped) | |



Part # RU-9931
Receiver, Western Elec.
5 1/2" long
Weighted hard rubber,
original finish, NOT glossy

Note this is only the shell. Working parts and armored cable are custom by AV Integrator.

- | | |
|--------------------------------------|-------------------|
| 1) multi channel headphone amplifier | Behringer HA-8000 |
| 1) Sync gen a/r | |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Welcome
NV1.E01.av01

Triggered audio message

- | | |
|-----------------|------------------------|
| 1) Speakers | JBL Control 25 |
| 1) MP3 playback | Alcorn 8-TraXX or 4MP3 |
| 1) Sensor | Passive Infrared / TBD |
| 1) Amplifier | QSC CX-302 |

Language Station
NV3.E01.av01

17" touch monitor, CPU, kbd & trackball, mic & headphones

- | | |
|-----------------------|---|
| 1) 17" Touch Monitors | ELO 1739L |
| 1) Computers | HP/Dell Pentium (see computer spec above) |
| 1) Trackball | Happ |
| 1) Trackball extender | a/r |
| 1) Cat-5 Extender | TBD/ Magenta |
| 1) Headphone Amp | Berringer HA-8000 |
| 2) Headphone | TBD Allow \$100 ea |
| 1) Voice Processor | Symetrix 528E |
| 1) Microphone | Shure MX-395 cardioid |

4.LIFE

Keritan Interactive LF2.E02.in01

~24 2" 2 digit readouts, electronics package & programming to run game

- | | |
|--|-------------------|
| 30) 2" 5x7 Led Dot Array | LiteON LTP-2157AY |
| Verify color with designer | |
| 30) circuit cards for above including Drivers, controller and touch sensor (note this must be PCB) | Custom |
| 1) Central controller/computer to run game. | Custom |
| 3) Capacitive sensors to start game | Custom |

All programming to provide complete functional interactive
Per media brief.

What Cells Can Do LF3.E02.av01

*~4'x'6' projected image linear media w/ sound
+ switch to video microscope.*

- | | |
|--|---------------------------------|
| 1) 5K lumen DLP Projector | Eiki EIP-5000 |
| 1) Lens (contractor sized) | |
| 1) Set spare lamps | |
| 1) Projector mounting | Custom |
| 1) SD Media Players
(see general notes above) | Alcorn DVM \ P
DoReMi Nugget |
| 1) Directional Speaker | Dakota FA-501 |
| 1) Pushbutton | Happ / TBD |
| 1) 12" video monitor | |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Populations Interactive LF5.E02.av01

~4'x'6' projected image linear media w/ sound

- | | |
|----------------------------------|--|
| 1) 3K lumen Projector SXGA+ | Projection Design F30sx |
| 1) Lens (contractor sized) | |
| 1) Set spare lamps | |
| 1) Projector mounting | Custom |
| 1) Computers | HP/Dell Pentium (see computer spec above) |
| 1) Fiber Extender | Geffen DVI 1500HD |
| 1) DVI-VGA converter | Extron DVI-RGB150 |
| 1) Vip Touch Foil 30-40" max 4:3 | ViP (co-ordinate size with exhibit fabricator) |
| 1) Set USB extenders | |
| a/r Master Show Control | |

Ecosystems
LF6.E01-E04.av01

(4) areas of natural sounds

Equipment list is for all (4) dioramas

- | | |
|--------------------------|----------------------------|
| 4) 4track MP3 player | Alcorn 8Traxx / or 4MP3 |
| 8) Small speakers | QSC AD-S52 (overhead) |
| 8) Small speakers | JBL Control 25 (in bushes) |
| 4) 4 channel amplifier | QSC CX-404 |
| 16) Speaker brackets | Custom |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Note DMX feeds to dimmers from show control.

Human Interactions
LF6.E05.av01

(4) audio players with mushroom handsets

- | | |
|-------------------------------------|-------------------------|
| 1) 4 track MP3 player | Alcorn 8Traxx / or 4MP3 |
| 4) Small handsets (mushroom shaped) | |



Part # RU-9931
Receiver, Western Elec.
5 1/2" long
Weighted hard rubber,
original finish, NOT glossy

Note this is only the shell. Working parts and armored cable are custom by AV Integrator.

- | | |
|--------------------------------------|-------------------|
| 1) multi channel headphone amplifier | Behringer HA-8000 |
| 4) optical "hook" switch | Sharp GP2A200LCS |
| a/r Master Audio Control | |

Talkback Station
LF6.E05.av02

computer blogging station text only

- | | |
|--|---|
| 1) 17" Monitors (touch optional) | ELO 1739 |
| 1) Computers
w/ rugged Keyboard/trackball | HP/Dell Pentium (see computer spec above) |
| 1) Cat-5 Extender | TBD/ Magenta |

5.THE LAND

Plate Tectonics LD1.E03.av01

- 1) 32" Video Globe
w/ 600Myr Paleo Animation
- 1) 15" Monitors
- a/r Master Show Control
- a/r Master Audio Control

Video Globe

- Omni Globe
- NEC ALSCD52V-BK

B&R Biogeography LD4.E08.av01

- 1) 26" LCD flat panels
- 1) Computers
- 1) Cat-5 Extender
- 2) Buttons
- a/r Master Show Control
- a/r Master Audio Control

26" Monitor Computer Interactive

- Sharp LC26SB24U
- HP/Dell Pentium (see computer spec above)
- TBD/ Magenta

Talkback Station LD4.E04.av01

- 1) 17" Monitors (touch optional)
- 1) Computers
w/ rugged Keyboard/trackball
- 1) Cat-5 Extender
- 1) Still Camera
- 1) USB interface

computer blogging station text and still cam

- ELO 1739
- HP/Dell Pentium (see computer spec above)
- TBD/ Magenta
- Quick Cam Vision Pro
- TBD

Jump Seismometer LD4.E03.av01

- 1) 15" Monitor
- 1) Computer

CPU, 15" Monitor. Seismometer by owner

- NEC ALSCD52V-BK
- HP/Dell Pentium (see computer spec above)

6.FIRST PEOPLES

Mapping Interactive FP2.E01.av01

- 1) Button
- a/r Master Show Control

lighting control only

- TBD

Ceramics, Tools & Weaving (3) 20" video playback w/ sound, linear media
FP5.E02.av01, FP5.E05.av01 & FP5.E08.av01

- | | |
|--|---------------------------------|
| 3) 20" LCD flat panels | ToteVision LCD-2007HDL |
| 3) SD Media Players
(see general notes above) | Alcorn DVM \ P
DoReMi Nugget |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Tool Interactive triggered MP3 playback
FP5.E06.in01

- | | |
|--------------------------|---------------------------------|
| 1) MP3 player | Alcorn 8Traxx / or 4MP3 |
| 1) Small speaker | TBD coord w/ Exhibit Contractor |
| 1) amplifier | QSC CX-302 |
| a/r Master Show Control | |
| a/r Master Audio Control | |
- Note trigger switches by Exhibit Contractor

7.LAKE

Sounds of the Lake (8) speaker natural sound soundscape
LK2.E01.av01

- | | |
|--------------------------|-------------------------|
| 1) 4track MP3 player | Alcorn 8Traxx / or 4MP3 |
| 8) Small speakers | QSC AD-S52 |
| 1) 8 channel amplifier | QSC CX-168 |
| 8) Speaker brackets | Custom |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Watershed 46" video playback w/ sound, SD linear media
LK2.E06.av01

- | | |
|--|---------------------------------|
| 1) 46" LCD flat panels | NEC LCD 4620-2-AV |
| 2) Display Speakers | Innovox FD-H2 (cut to length) |
| 1) Amplifier | QSC |
| 1) SD Media Players
(see general notes above) | Alcorn DVM \ P
DoReMi Nugget |
| a/r Master Show Control | |
| a/r Master Audio Control | |

People and the Lake
LK2.E05.av01

46" video playback w/ sound, SD linear media

- | | |
|--|-------------------------------|
| 1) 46" LCD flat panels | NEC LCD 4620-2-AV |
| 2) Display Speakers | Innovox FD-H2 (cut to length) |
| 1) Amplifier | QSC |
| 1) SD Media Players
(see general notes above) | Alcorn DVM \ P |
| a/r Master Show Control | DoReMi Nugget |
| a/r Master Audio Control | |

8.PAST WORLDS

Paleo Prep
PW7.E01.av01

video playback w/ sound, SD linear media

- | | |
|--|------------------------|
| 1) 20" LCD flat panels | ToteVision LCD-2007HDL |
| 1) SD Media Players
(see general notes above) | Alcorn DVM \ P |
| a/r Master Show Control | DoReMi Nugget |
| a/r Master Audio Control | |

Pleistocene Dinner Table
PW2.E04.av01

5 track triggered MP3 playback

- | | |
|--------------------------|---------------------------------|
| 1) 5track MP3 player | Alcorn 8Traxx / or 4MP3 |
| 1) Small speaker | TBD coord w/ Exhibit Contractor |
| 1) amplifier | QSC CX-302 |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Note trigger switches by Exhibit Contractor

Cleveland Lloyd Quarry
PW5.E03.av01

4 ch sync video playback w/sound, linear media

- | | |
|--|-------------------------------|
| 4) 32" LCD flat panels | NEC LCD-3220 |
| 4) Display Speakers | Innovox FD-H2 (cut to length) |
| 1) Amplifier | QSC CX-404 |
| 4) SD Media Players
(see general notes above) | Alcorn DVM \ P |
| 1) Sync gen a/r | DoReMi Nugget |
| a/r Master Show Control | |
| a/r Master Audio Control | |

Late Cretaceous Soundscape
PW4.E01.av01

(6) speaker natural sound soundscape

- | | |
|--------------------------|-------------------------|
| 1) 4track MP3 player | Alcorn 8Traxx / or 4MP3 |
| 6) Small speakers | QSC AD-S52 |
| 1) 8 channel amplifier | QSC CX-168 |
| 6) Speaker brackets | Custom |
| a/r Master Show Control | |
| a/r Master Audio Control | |

9.UTAH FUTURES

Sustainability Interactive
UF3.E01.av01

Diorama Projections & interactive

- | | |
|-----------------------|-----------------------------|
| 1) 10K Lumen DLP | Panasonic PT-DW-10000U |
| 1) lens | contractor sized |
| 1) set spare lamps | |
| 2) CPU | HP/Dell |
| 1) Graphics Card | TBD |
| 1) Fiber Extender | Geffen DVI 1500HD |
| 1) DVI-VGA converter | Extron DVI-RGB150 |
| 3) Gesture Cameras | Sentec STV-160BC |
| 3) Lens | contractor select to cover. |
| 3) Screw on IR filter | Custom |
| a/r Camera interfaces | |
| 8) IR Illuminators | Custom |
- 1) Custom gesture capture software per interactive write up. This is only the capture system. Media production by others.

Talkback Station
UF3.E01.av02

AudioVideo recording station + Playback station

- | | |
|------------------------------|---|
| 1) 20" Monitor w/ camera | Dell SP2009W |
| 1) 32" LCD monitor | NEC LCD 3220 |
| 2) Computers | HP/Dell Pentium (see computer spec above) |
| w/ rugged keyboard/trackball | |
| 2) Cat-5 Extender | TBD/ Magenta |
| 2) Wall speakers | JBL Control 126W |
| 1) Amplifier | QSC CX-302 |
| 1) Voice Processor | Symetrix 528E |
| 1) Microphone | Shure MX-395 cardioid |

10. OUR BACKYARD

**Our Backyard Animal Sounds
OB2.E01.av01**

(5) *speaker soundscape*

- 1) 8track MP3 player
- 5) Speakers in tree
- 1) multi channel amplifier

Alcorn 8Traxx / or 4MP3
 3-4" Custom Coord w/ exhibit fab
 QSC 168

11. OTHER SYSTEMS

Central Dimmer

a/r ETC Pharos (or equal to match contractor provided dimmer if not ETC) controls to implement:

- "Life Intro" gobo effects LF1.E01
- "Mapping Interactive" grid lighting FP2.E.01.av01
- "Ecosystems" LF6.E01-04.av01

These exhibits all have lights that are either looping, synchronized to AV or triggered by visitor buttons.

Wiring & Programming by AV integrator.

The dimmer itself will be purchased and installed by the base building electrical contractor.

Labs *Projection w/ laptop interface, Central SD media, speakers*

- PW8.av01** **Earth Lab**
- FP3.av01** **Dry Cave Lab**
- LF7.av01** **Naturalist Lab**

Equipment list is for all (3) labs

- 3) DLP Projector Panasonic PT-D5700UL
- 3) lens sized by contractor
- 3) Sets spare lamps
- 3) Laptop interface Extron RGB 460xi
- 3) SD Media Players Alcorn DVM \ P
- (see general notes above) DoReMi Nugget
- 16) Ceiling Speakers JBL Control 26CT
- 1) 70V amp QSC CX-204V
- 3) Headworn w/l mics Sure ULXPro 14/30
- 1) Complete Assistive listening system Listen LS-02-072
- 3) Wall Control Stations AMX MET-6N
- a/r Control system
- a/r Audio System include individual volume control for each input
- 1) 8.4" rack mount touch panel AMX
- 1) Control software Custom

**“History Now” Stations
HV.AV01-AV03**

computer, monitor on rolling cart

Equipment list is for all (3) carts

- | | |
|--|---|
| 3) 20" Monitors | NEC LCD205WNXM |
| 3) Computers
w/ rugged Keyboard/trackball | HP/Dell Pentium (see computer spec above) |

Demo Areas

Wireless mic, controls, speakers

Equipment list is for all (7) Demo Areas

- | | |
|--|--|
| 14) Ceiling Speakers | JBL Control 26CT |
| 2) 70V amp | QSC CX-204V |
| 7) Headworn w/l mics | Sure ULXPro 14/30 |
| 1) Complete Assistive listening system | Listen LS-02-072 |
| 7) Wall Control Stations | AMX MET-6N |
| a/r Control system | |
| a/r Audio System | include individual volume control for each input |
| 1) 8.4" rack mount touch panel | AMX |
| 1) Control software | Custom |

Common Equipment

- | | |
|---|--------------------------------|
| a/r racks & accessories | Middle Atlantic MRK series |
| a/r AC power distribution & seq. | Middle Atlantic |
| 2) Rack drawer for remotes | |
| 1) Dual Rack mount video monitor | Custom / Marshall VR-82 series |
| a/r Video multiplexor
(connect all video players) | Extron/ Honeywell |
| a/r Ethernet Switch 24port, 1Ghz
(connect all computers & controllers) | Netgear/Cisco (coord w/ owner) |
| a/r KVM w/ 2 outputs
(connect all computers) | Unimux 32x4 |
| 1) 15" Monitors | NEC ALSCD52V-BK |
| 1) Rack mount keyboard shelf | Custom/ TBD |
| 2min) UPS
Size ups to power racks | Triplite Smart2200RMXL2U |

PART 4- EXECUTION

4.01 EXAMINATION

- A. Prior to commencing installation, verify all critical dimensions and conditions under which work is to be installed. Notify Owner in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of work. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Insure that no devices (including cameras, monitors, projectors, microphones and loudspeakers) are prevented from achieving their intended function by interfering fixtures, architectural elements, or other audiovisual equipment. Notify Owner in writing of any such problems, and do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Contractor is responsible for assuring that no CAT5 cable runs provided by the Contractor exceed 90m. Notify Owner in writing of any runs that will exceed this distance.
- D. Carefully verify all required projection and camera lens focal lengths to achieve desired image sizes and projector locations. Notify Owner in writing if no lens will fit the requirements. Note this means no lens, not just the standard lens that comes with the projector.

4.02 INSTALLATION

- A. General
 - 1. All cables, regardless of length, will be marked with permanent, non-handwritten number or letter cable markers within six inches of both ends. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and/or run sheets.
 - 2. All cables shall be installed splice free from backboard, rack or frame to final destination.
 - 3. Each of the cable groups identified in the project drawings are to be run in separate conduit, bundled separately where run in trays, and grouped within racks except where specifically noted.
 - 4. Wherever possible, maintain 3" separation between cable groups. Maintain larger separations where necessary to avoid interference.
 - 5. All cable shall carry at least the NEC CM rating. Use plenum cable everywhere in project other than within racks or in runs completely within conduit.
 - 6. Provide sufficient ventilation within racks to insure that all equipment operates within manufacturer's recommendations.
 - 7. All boxes and equipment shall be mounted plumb and square.

- B. Audio
 - 1. Maintain phasing throughout the audio system.
 - 2. Use crimp type lugs where stranded wire is connected to barrier strips and binding posts.
 - 3. Each rack shall contain a grounding bus bonded to the rack frame and connected to the audiovisual power distribution panel with a #6 or larger conductor. The rack shall show an impedance of at least 100 Kohm to ground when this conductor is lifted.
 - 4. AC outlets within racks shall have ground wires, which shall be connected to the rack ground bus.
 - 5. Connect audio cable shields at one end or both ends to produce best system noise performance. Mic lines and tie lines shall have shields connected at both ends.
- C. Video
 - 1. All coaxial cable connections shall be made with crimp type BNC connectors. Provide adapters from BNC to UHF, S-Video or RCA connectors where required.
 - 2. All video receptacles shall be insulated from the panels in which they are installed.
 - 3. Terminate all unused outputs with the appropriate impedance.
 - 4. Video signals may not be looped through connections unless explicitly specified.
 - 5. The lengths of the cables used to carry S-video and component video signals shall be matched to within 1".
 - 6. Projectors and cameras shall be installed so that images do not move or vibrate perceptibly under normal operating conditions.

4.02 FIELD QUALITY CONTROL

- A. In all cases, provide written documentation of tests including date, test equipment used, test equipment configuration and results.
- B. Initial Tests and Measurements:
 - 1. Verify the operation of all system equipment.
 - 2. Verify pinout and pairing of all wiring.
 - 3. Verify DCE/DTE (pin 2/3) requirements of all serial cables. Test to verify voltage on both pins. Wire cable as x-over (null modem) if required.
- C. Audio-Visual Systems:
 - 1. Verify that audio systems are free from perceptible hum and buzz.

2. Conduct measurements and adjust audio systems to meet performance standards.
3. Measure impedance of all loudspeaker circuits at 1 kHz and verify that transformer tapping is appropriate.
4. Test that all coaxial cables are free from shorts and isolated from ground.
5. Verify that video systems do not exhibit interference effects from AC power circuits (video hum).
6. Align all video projectors and adjust color balance on projectors and monitors.

4.03 MUSEUM TRAINING

- A. Provide 20 hours of training to persons designated by the Museum in the operation of the systems in 5 non-contiguous 4-hour sessions.
- B. See also "Section 01820 Demonstration and Training" for other requirements.

4.03 FINAL ADJUSTING AND ACCEPTANCE TESTS

- A. Inventory all equipment on site and compare to equipment lists in contract documents.
- B. Demonstrate operation of all systems and equipment.
- C. Review initial testing measurements. Repair system and repeat measurements as required by the Owner. Provide the following test equipment for use in making adjustments and acceptance testing by the Owner:
 1. Composite, S video color bar generator.
 2. 1/3 octave real time analyzer, calibrated SPL meter, and RMS voltmeter capable of reading in dBu.
 3. Audio tone generator and pink noise generator.
 4. Audio impedance meter operating at 1 kHz.
 5. Audio analyzer capable of measuring frequency response: MLSSA 9.0, TEF 20 or SIA SMAART.
 6. Cat 5 tester
 7. Video Test Generator both SD & HD
- D. Provide personnel expert in the operation and programming of all installed equipment for up to 80 straight time hours and 10 overtime hours to assist owner and consultant for adjustment and acceptance testing.
- E. Tests may be suspended at the option of the Owner if the systems fail to operate or if defective equipment requires repair or replacement. Tests will be resumed when the problems have been corrected by the Contractor.

4.04 CLEANUP AND REPAIR

- A. The job site should be left clean and any damage caused to premises by installers should be repaired at no cost to Owner.

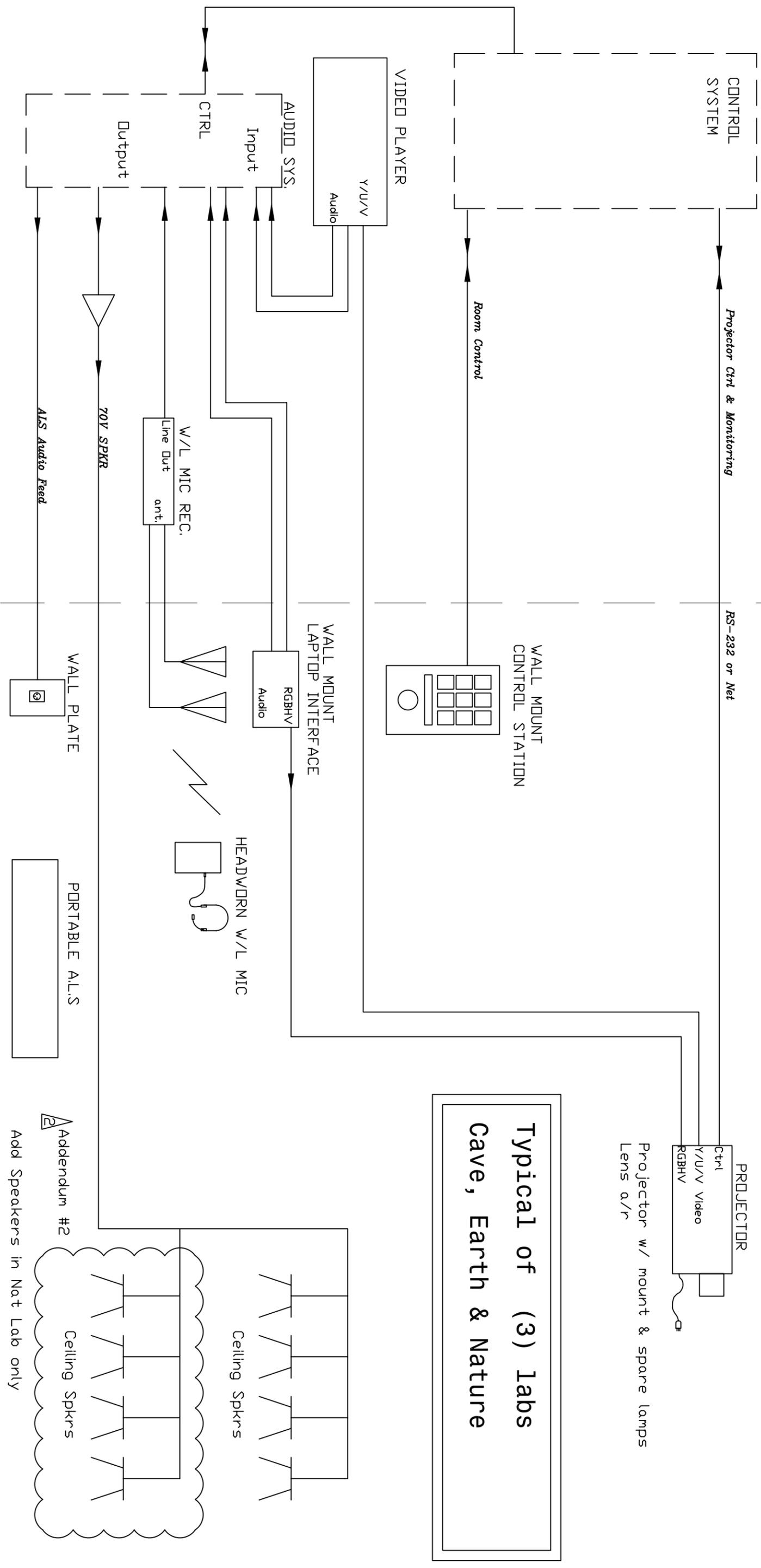
4.05 PROTECTION OF WORK

- A. It is the responsibility of the contractor to protect finished and unfinished work against damage or loss until the date of final acceptance. Contractor shall take measures to prevent damage by dust and other byproducts of construction. Repair damaged work at no cost to the Owner.
- B. Museums are full of artifacts and other irreplaceable objects. While most of your work will take place prior to the installation of artifacts there will be some overlap. It is imperative that you take extra care to avoid risks to these objects. If you are unsure ask the museum staff for assistance.
Also many of these items have deep cultural value and no jokes or disrespectful comments will be tolerated.

END OF SECTION

CONTROL ROOM

EXHIBIT FLOOR



UTAH MUSEUM OF NATURAL HISTORY
UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UAMU
1350 East Presidents Circle
Salt Lake City, Utah 84112
801.581.6827 tel.

Design Architect
Pulchik Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Giles Strangly Burns Smith
575 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Lellis E. Robertson Associates
30 Bow Street
New York, New York 10004
212.750.9000 tel.

Building Engineer
Dart Associates
330 West 800 South, Suite 100
Salt Lake City, Utah 84101
801.579.8877 tel.

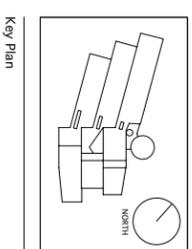
Mechanical/Electrical/Plumbing/Engineer
Cahill Engineering Associates, Inc.
524 West 600 South
Salt Lake City, Utah 84103
801.322.2400 tel.

Electrical/AV Engineer
Spectrum Engineers
1222 East 26th Street
Salt Lake City, Utah 84111
800.678.7077 tel.

Lighting
Bartlett Partnership
1222 East 26th Street
Salt Lake City, Utah 84111
212.924.4050 tel.

Audio Visual
EAT Engineering, Inc.
241 Orange Street
San Francisco, CA 94134
415.685.9555 tel.

Exhibition Planner and Designer
Ruth Argalbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



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Sheet Title
LABS
Date
April 2, 2009
Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
AV - 130

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

CONTROL ROOM

ELECTRICAL ROOM

ELECTRICAL ROOM

MASTER
SHOW CONTROL

ETC PHARDS controller
or equal if not ETC

4

Control from "Ecosystems" X4

EXHIBIT FLOOR

Button

BUTTON #1

FP2.E01.a.v01

ETC SENSOR DIMMER RACK
or equal
provided by base bldg. electrical
installed by base bldg. electrical

LIGHTING CKTS
by base building electrical

Addendum #1

Dimmer now provided & Installed by GC (base building electrical)
Controls & programming by AVI
brand of dimmer pending GC purchase

Program PHARDS, and show controller
to run gobo effect on "Life" wall per media treatment
and First Peoples Mapping Interactive per media treatment

Addendum #2

Add functionality for Mapping Interactive FP2.E01.a.v01

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Owner
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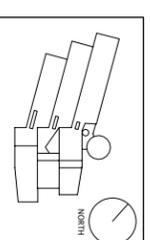
Electrical/AV Engineer
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1222 East 26th Street
Salt Lake City, Utah 84111
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Exhibit Construction



Key Plan

No. / Issue Name / Date	

No. / Issue Name / Date	

Sheet Title

CENTRAL DIMMER

Date
April 2, 2009

Scale*

RAA Project No. 0275

U. of U. Project No. 0872-9630

DFCM Project No. 02243750

Sheet No.

100% Final Design April 2, 2009

AV - 133

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")