Battle Point Astronomical Association
Capital Project Initiative

December 15, 2007

Harry Colvin, BPAA President
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Preamble
In the spring of 2007 the Battle Point Astronomical Association (BPAA) formed a work group to discuss issues related to the current state of the Ritchie Observatory infrastructure and to create a plan that would address the future infrastructure needs of the BPAA for the next 50 years. Members of the work group were BPAA board officers Harry Colvin, Malcolm Saunders, Russ Heglund, Nels Johansen and Steve Ruhl, BPAA members Mike Browning, Frank Schroer, and architect Frank Karreman. BPAA Treasurer Eric Cedarwall provided the work group with the necessary financial information. After a series of meetings and discussions among work group members, this BPAA Capital Project Initiative was produced, with the help of BPAA Newsletter Editor Vicki Saunders, describing the future infrastructure needs and goals of the BPAA.

Executive Summary
The Battle Point Astronomical Association (BPAA) is a non-profit corporation. It was founded in 1992. Its mission is to provide the community with an organization and an astronomical observatory for science education, public viewing, and professional-amateur collaborative astronomical research projects. In 1997 BPAA completed the construction of the Ritchie Observatory located in Battle Point Park on Bainbridge Island. The Ritchie Observatory houses a 27-inch telescope, planetarium, workshop, library, and meeting room.

To continue to provide and improve critical and unique services to the community a long-term capital improvement project is planned that when completed will serve the community for the next fifty years. For funding and planning reasons the project has been divided into two phases. In Phase I we will seek funds to expand astronomical viewing capability and renovate the existing Ritchie Observatory. Renovation will include replacing the telescope dome, installing rest rooms, upgrading flooring, finishing interior walls, modifying the roof, improving telescope dome access, and upgrading lighting and heating systems. In Phase II we plan to install a prototype remote robotic telescope system, construct an addition to the Ritchie Observatory that will have a planetarium seating capacity of approximately fifty and contain educational exhibits, provide more efficient access to the Ritchie Observatory telescope, and improve parking and landscaping.

History
The Ritchie Observatory houses the 27-inch Ritchie Telescope, the largest telescope accessible to the public in the Pacific Northwest. The Ritchie Observatory was constructed from the shell of the Helix Building, a World War II relic that in 1992 was scheduled for demolition and removal by the Bainbridge Island Parks Department. Thanks to the vision of the founders of the Battle Point Astronomical Association, that demolition never took place; instead, through private volunteer community efforts an Observatory was born. The basic construction was completed in 1997 and improvements have been ongoing since that time, the most recent being the addition of a temporary planetarium dome inside the main meeting hall of the Observatory. Because many programs of the Battle Point Astronomical Association have expanded and requests for greater access are increasing, it has become imperative that the Observatory be improved to better serve the public.

Future Vision
BPAA’s broader mission is to increase public participation in and awareness of the importance of science in our society. Thus our vision for the BPAA and the Ritchie Observatory is to expand our astronomical programs and increase public outreach to all residents of Bainbridge Island, the Kitsap Peninsula and the Seattle/Tacoma areas. In education, the BPAA will work with educational institutions to provide a facility that will serve the needs of students of astronomy at all levels from grade school to college. The BPAA will provide to those in our community with an interest in astronomy an opportunity to practice at levels from beginner to advanced amateur. And for those cloudy nights when we can not observe locally, the Observatory will have broadband access to a remotely sited robotic CCD telescope system allowing
advanced observational studies, research collaborations with professional astronomers, and advanced and general observational programs. For the general public we wish to have regularly scheduled weekend planetarium shows in an Imax format that are as much entertainment as they are educational events. Offering these expanded services will require professional paid staff to coordinate the added programs and to recruit new volunteers.

**Education Astronomical Outreach**

Education astronomical outreach has been a key mission for the BPAA. We accomplish this by honoring requests from community education groups and youth organizations for private star party presentations. Many of these programs are conducted at the Ritchie Observatory, but we also have the capability of presenting planetarium shows off-site with the use of a portable planetarium dome and projection equipment.

Other outreach education programs include summer astronomy camps, beginner astronomer sessions, and invited speaker presentations, mainly by professional astronomers from university faculties.

**Program Information**

**Beginner Session & Star Party**

Each month BPAA hosts a Beginner Session planetarium program followed by facility tours and a star party. The dates of these events are determined by lunar phase (so as to maximize viewing during the star party) and the times by when it gets dark.

The planetarium program contains two main parts, a special topic that may be seasonal or something in the news related to astronomy. There is also an introduction to the night sky, describing what the current seasonal sky will look like. Instruction in “star hopping” is included to show how amateur astronomers locate objects in the sky for viewing with backyard telescopes.

The show is interactive, and guests are encouraged to ask questions about the sky, purchasing or using telescopes, or any topics related to astronomy. If there are too many guests for a single seating, tickets are given out with times for subsequent showings. BPAA members are on hand to demonstrate the use of and answer questions about telescopes during and after the planetarium show. Facility tours are conducted, including a look at and through (weather permitting) the Ritchie Telescope.

If the weather is clear, as we always hope it will be, the pièce de résistance after dark is the star party, when astronomers put their telescopes to use and let everyone take a look at the real thing – the night sky.

**Recent shows**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 10, 2007</td>
<td>Annual motion of the sun; the Analemma</td>
<td>About 25</td>
</tr>
<tr>
<td>April 14, 2007</td>
<td>Precession of Equinoxes, Precession of poles</td>
<td>About 45 (2 shows)</td>
</tr>
<tr>
<td>May 12, 2007</td>
<td>Constellations, what they are &amp; are not; different cultural perspectives of Constellations using Ursa Major as example</td>
<td>About 20</td>
</tr>
<tr>
<td>June 9, 2007</td>
<td>Galaxies, seeing the Milky Way, Andromeda &amp; others; what we know about galaxies--our own &amp; distant ones</td>
<td>About 45 (2 shows)</td>
</tr>
<tr>
<td>July 7, 2007</td>
<td>The Glorious Globular Clusters of Summer, what are they, how do they form, impact of light pollution on seeing them</td>
<td>About 45 (2 shows)</td>
</tr>
<tr>
<td>August 4, 2007</td>
<td>Lunar eclipses, why they happen, when they happen, how to observe one</td>
<td>About 50 (2 shows)</td>
</tr>
<tr>
<td>September 8, 2007</td>
<td>Mars, planetary motions, retrograde motion</td>
<td>About 35 (2 shows)</td>
</tr>
<tr>
<td>October 6, 2007</td>
<td>Mysteries of the Moon: Origins, Orbit, Phases</td>
<td>About 20</td>
</tr>
</tbody>
</table>
November 3, 2007  The Southern Hemisphere: The Best Deep Sky Objects We Never See From Here: Spectacular sky objects not observable from northern latitudes  About 45 (2 shows)

December 1, 2007  A Ride through the Orion Nebula: a breathtaking 3-D trip through this spectacular stellar nursery, followed by a look at the birth of stars and the stellar life-cycle.  About 20, despite freezing rain and snow

January 5, 2008  Jewels of Winter Night Sky  TBD

Fourth of July Planetarium Shows

As an extension of our beginner program, we have done an outreach session during the “Grand Old Fourth” celebration in Winslow. We have held the shows at the Eagle Harbor Congregational Church for the past two years. The 2007 show had an “Ask the Astronomer” format. We had about sixty-five people in and out of the planetarium during the day.

2007 Speakers Program

<table>
<thead>
<tr>
<th>DATE</th>
<th>SPEAKER</th>
<th>TOPIC</th>
<th>ATTENDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 21, 2007</td>
<td>Dr. Paula Szkody</td>
<td>Land &amp; Space Based Telescopes in the Study of Cataclysmic Variables</td>
<td>18</td>
</tr>
<tr>
<td>May 9, 2007</td>
<td>Ward Yohe</td>
<td>Exploring Our Solar System</td>
<td>12</td>
</tr>
<tr>
<td>April 13, 2007</td>
<td>Alice Few</td>
<td>NASA/JPL Sky Network Program</td>
<td>10</td>
</tr>
<tr>
<td>April 21, 2007</td>
<td>Martin Valente</td>
<td>Fabrication &amp; Testing of Optical Systems at the U of Arizona</td>
<td>24</td>
</tr>
<tr>
<td>September 2, 2007</td>
<td>Dr. Eckart Schmidt</td>
<td>Deep Impact, Ready for the Next One?</td>
<td>20</td>
</tr>
<tr>
<td>October 10, 2007</td>
<td>Dr. Tom Van Flandern</td>
<td>The Exploded Planet Hypothesis</td>
<td>15</td>
</tr>
</tbody>
</table>

Astro Camps

In conjunction with the Bainbridge Island Parks Department, we held three Astro Camps in 2007, each consisting of four three-hour afternoon sessions and one night session. The night session included a planetarium show and a star party, where camp participants viewed the night sky through the 27” Ritchie Telescope and through telescopes set up by BPAA members.

School Group Events

<table>
<thead>
<tr>
<th>DATE</th>
<th>SCHOOL</th>
<th>GRADE/AGE</th>
<th>PROGRAM</th>
<th>ATTENDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 15, 2007</td>
<td>Carden School, Bainbridge Island</td>
<td>1st and 2nd</td>
<td>school portable planetarium presentation</td>
<td>9 students, 1 teacher and 1 parent</td>
</tr>
<tr>
<td>May 26, 2007</td>
<td>Blakely Elementary School, Bainbridge Island</td>
<td>K-5th</td>
<td>two-hour program that included an observatory tour, a planetarium show and family activity in the library.</td>
<td>18 (students and parents)</td>
</tr>
</tbody>
</table>
Testimonials from Program Attendees

On behalf of The Museum of Flight I thank you for helping out with the Aerospace Camp Experience. Your contribution to ACE helped make this a truly memorable summer for the campers. I look forward to working with you again to make next summer even better.

Katie Peterson
ACE Coordinator
The Museum of Flight, Seattle, WA

When we were sharing with campers and counselors during the week about (the BPAA docent’s) visit, he was known as the “Planetarium Guy” and the kids kept referring to him all week long. When new guests come, we never really know how they will be received or quite frankly how entertaining they will actually be. In the past, we have had storytellers and oral presentations that have not held their interest and so I get the flack for it because they think it is funny to give me a bad time on non-entertaining presentations. To say that (the BPAA docent) and the presentation from Battle Point Astronomy was a hit is an understatement. The kids came out of the “bubble” with “awesome,” “that was so cool,” “the man said he is coming back next year,” “I can’t wait to tell my mom about the lunar eclipse,” “it was the best thing at camp,” “thank you for bringing the planetarium man to camp,” “can I see it one more time?” . . . (The BPAA docent) stayed for lunch and agreed to stay longer to give a few more kids a chance to watch
his “show.” We cannot thank (the BPAA docent) enough for giving so unselfishly to us. These kids for the most part, especially the ones who are in power wheelchairs, never get to see something like this and we appreciate it so much. That week we had visit Remote Control Boats, Improv, the Army with the Evidence Recovery Team, Wheelchair Races, Dances, Crafts, Talent Show, Casino Night, campfires and board games. It was Battle Point and (the BPAA docent) that ruled the conversation. THANK YOU THANK YOU. Thank you for making summer camp so complete.

Leslie M. Boback
MDA Camp Director
Muscular Dystrophy Association, Tacoma, WA

★

I wanted to personally thank you for the great presentation that you gave our 1st and 2nd grade students. I have heard all kinds of fantastic facts and stories since. I know that the students loved it and that Mrs. Otte was deeply appreciative.

Regards,
Belinda Thornburg
Carden Country School (parent)

Newsletter, Web site, and Email group
BPAA's award-winning newsletter is published four times per year and contains original articles written by members as well as an events calendar for the coming months. BPAA's Web site www.bpastro.org contains administrative content, schedules, historical information about the BPAA, and links to astronomical information. The association also monitors and maintains a Yahoo email group for members.

Public Viewing Events
Each month, weather permitting, we hold public viewing events, offering members of the community an opportunity to observe astronomical objects through one of the largest telescopes in the Pacific Northwest. During these events many members also set up smaller telescopes on the grounds surrounding the Observatory. These telescopes increase our ability to show the public a variety of celestial objects. BPAA also has a solar telescope that allows viewing of solar objects such as sunspots and solar flares. With Stellacam II equipment we can project celestial objects viewed through the Ritchie telescope and other scopes onto a video monitor for viewing by people who have limited mobility or are in wheelchairs.

Telescope Training and Construction
BPAA offers both workshops and special sessions for beginners who wish to learn how to use telescopes. The BPAA has constructed several telescopes in the past several years and is currently constructing a 20-inch portable telescope that will be available for use on the Observatory grounds. BPAA members may also check out telescopes for use at home or when they travel to remote dark sites for viewing.

Unique to the BPAA is the ability to train members in the operation of the Ritchie Telescope. Once trained any member has full access to the Observatory and use of the 27-inch Ritchie telescope.

Astronomical Research
Some BPAA members are involved in research collaborations with professional astronomers involved in the study of variable stars. The BPAA has a long-term goal to become more active in these collaborative research efforts once BPAA's robotic telescope systems are available for its members.
Telescope Dome

The dome that houses the 27-inch Ritchie telescope is primarily of wood construction. There are problems both in the design and access. To view through the 27-inch telescope one must climb up a spiral staircase into a construction feature called the doghouse. From there one gains access to the roof, then climbs up a second drop down ladder into the dome proper. Once inside the dome there is a third ladder that must be climbed to view through the telescope eyepiece. Once viewing is complete one must climb down a fourth ladder and walk around a ledge that contains a number of metal ribs and electrical cables to exit the dome structure.

For experienced astronomers this arrangement is satisfactory. For the general viewing public not familiar with climbing ladders in the dark, the experience is not pleasant and can be dangerous, especially for children and adults with limited night vision capabilities.

Because of these hazards, it is now only possible to allow small groups of six or less to access the dome and view through the Ritchie telescope. In addition, it normally takes three to four volunteers just to assist visitors and help them negotiate their way to the telescope eyepiece.

Other hazards are also present. The ladder into the dome rotates with the dome when changing the position of the telescope. Those outside the dome on the roof are at risk of injury from the rotating ladder. A far more serious danger exists when the dome ladder is in certain orientations. It is then possible to fall off the roof by going over the roof railing. To prevent a possibly fatal fall, temporary extensions have been added to the existing rail structure in two places.

The dome is constructed of wood and is rotting in many places. The necessary repair work is now dependent on volunteer labor. As a result, the work is not being performed on a regular schedule nor is it completed in a timely fashion. Under current circumstances it is clear that the dome will not last another 50 years, the lifespan of our vision for the Ritchie Observatory.

There are also technical issues with the current
dome. One of the major problems is that the dome slit is too narrow. This makes continuous viewing with tracking more difficult. Nor does the current design allow for synchronized control of dome rotation with telescope movement.

We need an improved dome, constructed with materials that will last and designed for better access and control.

**Roof**

The Observatory roof leaks. The roof is exposed to wind and rain during the winter months. We are experiencing ongoing water damage to interior wallboards, requiring that they be replaced and repainted repeatedly. The problem is both expensive and time-consuming for our volunteer labor force. The problem may be in the design of the door framing, known as the doghouse, or may be in the roof itself.

A different access method to the dome will eliminate the need for a doghouse and simplify the solution to our leaking roof.

**Planetarium**

The BPAA has purchased a planetarium projector, and a portable dome for off-site planetarium shows. The current planetarium dome, located in the main meeting room of the Observatory, is a temporary structure, inadequate for long-term use. The domed projection surface is constructed from cloth material stretched over tubing and the entire dome is suspended from the ceiling with cords. This arrangement does not provide the best projection surface. Many images from the projector are blurred. Setup for planetarium shows is time-consuming requiring that chairs be moved from storage to the main meeting room. We can seat only twenty-five people and have had to run more than one show on some nights. The main meeting room has also lost some of its utility with the installation of the portable dome. John Rudolph’s ‘solstice pinhole,’ which
focuses an image of the sun onto the wall during summer and winter solstices, is blocked, we’ve lost a large projection surface for public speaking events, and the room is now overcrowded.

**Exterior Walls**

To be blunt, the exterior walls of the Ritchie Observatory are ugly. The building was not designed to be pleasing to the eye. Its exterior walls are drab and do not reflect the current purpose of the structure. In fact, several openings are covered with plywood boards. This gives the impression that the structure is not valuable and invites vandalism and graffiti.

**Interior Walls**

Many of the interior walls of the Ritchie Observatory were never finished and painted. This does not give visitors a positive impression of the Observatory. In many areas such as in the stairwells the unfinished walls prevent light reflection, causing these areas to be dark and hazardous. All the walls should be finished and decorated to reflect the nature of the Observatory where possible.

**Flooring**

The Observatory hosts thousands of visitors each year. Some areas of the Observatory, such as the entryway, have no flooring, and do not provide a good impression to visitors. Where flooring has been installed, it is drab and difficult to keep clean. The flooring should be upgraded for durability and easy maintenance. It should also reflect the mission of the Observatory.

**Lighting**

There is not enough lighting. Some switches are not placed correctly. Lighting in the stairwells and workshop is not sufficient. Working in the workshop areas often requires the placement of temporary lamps, which presents a serious safety issue when working with power tools. Directional track lighting would provide flexibility in different lighting situations. We also need additional motion-activated exterior security lighting.

**Security**

Although the Observatory has a security system, improvements are needed. Additional cameras need
to be installed and the system upgraded for remote web monitoring. Email alerts should be sent when unexpected motion is detected inside or outside the observatory. Frames taken by motion sensitive cameras should be easily remotely monitored by those responsible for Observatory security.

**Heating**

The current heating and ducting systems in the Observatory are totally inadequate. The oil heater is smelly and noisy. The Observatory never adequately heats up in the winter. During public events the Observatory seems to be cold and many attending our meetings have complained about how cold they are. This leaves a bad impression on our visitors. During the summer the upper floors in the Observatory are so poorly ventilated that they become uncomfortable to use. This is an acute problem in the workshop area when using solvents or paint materials. Our current solution is to open the upper doghouse door on the roof to draw air through the building. The heating, cooling, and ducting systems need to be replaced.

**Entryway**

Our entryway is drab and uninviting. There is no directional lighting, no flat screen visual presentations, and no flooring. The entryway simply is not designed to draw visitors into the facility.

**Storage**

We have run out of storage and the problem is getting more acute as we add equipment and programs. Telescopes that we use for public star viewing events are stored in a small office off the main entryway. When we finish the construction of a new 20-inch telescope, some of the telescopes will have to be moved to the library upstairs. We are already storing some telescopes upstairs in the library where they are not as secure. This also means that most telescopes that are upstairs can’t be used easily because they have to be carried down narrow stairways. Should we receive more telescope donations we may have to consider renting storage off-site. Chairs that we use for public speaking events and planetarium shows are now stacked in the furnace room that also serves as a kitchen. Expensive equipment such as the planetarium projector must remain in the main meeting room because we have no place to store it.

**Rest Rooms**

The fact is that we do not have rest rooms. What we do have is a smelly, disgusting, and unsightly portable unlighted sanican that sits outside the
observatory. It presents an unacceptable public image. This situation is limiting our ability to expand our public programs and recruit volunteers. Most of our programs are held in the evening and many visitors don’t stay around very long. Not only is this situation unsanitary, it has already resulted in having to transfer our Robot program to a parks facility.

**Sound and Visual Aid Systems**

Public programs are an important service to our community. Our sound and visual aid systems are not adequate and need to be upgraded. All are temporary nonprofessional installations. The BPAA purchased the sound equipment; two flat screen monitors were donated. The projector was purchased several years ago and is now outdated and needs to be replaced. The entryway does not have flat screens for informational and introductory presentations.

**Computer Systems**

All of our computers are donated and none represents current technology. For the Observatory to operate many of its telescopes it is essential that we update our computers and computer network systems. Our single laptop is old and not capable of running many programs. Network and other infrastructure cabling to visually present real time images from the Ritchie telescope for disabled individuals is not in place.

**Wheelchair Access**

The Observatory has minimal wheelchair access, limited to the lower level. Even this access is difficult because there is no permanent ramp to cover a step at the front door. Because wheelchair access to telescopes is so limited we need to ensure that our real time images from the Ritchie telescope can be “piped” to the lower floor for viewing. Laptops for viewing with smaller telescopes and video equipment are not part our current computer equipment. Our Stellacam II and sun viewing telescopes also need to be upgraded to extend viewing opportunities to individuals with disabilities.

**Parking**

Parking for the Observatory is inadequate. What exists is gravel and extremely difficult for wheelchair access.

**Landscaping**

Our landscaping has not been designed to meet the needs of the Observatory. There are many trees that in time will obscure the horizon and make small telescope viewing on the grounds surrounding the Observatory difficult. Many of these trees need to be replaced with low slow-growing plants. Other plants should be incorporated into a design that will complement the Observatory. Watering of plants is now the responsibility of volunteers and much of our existing landscape has died off from lack of water. Lack of a properly designed and maintained landscape presents a poor public image.

**Artwork**

Art that reflects the Observatory’s mission or honors its founders is lacking, in fact, the Observatory has little artwork inside or on the surrounding grounds.

**Small Telescope Viewing**

Public viewing events using small telescopes are an essential part of the BPAA’s mission. The grounds surrounding the Observatory are often wet and electrical cords must be run to the telescopes to operate tracking motors. This is both a safety hazard as well as being inconvenient for set-up. There are currently no hard surface areas with electric power in place for small telescope set-up.
Impact on Current Programs

All of these deficiencies when added together are having a significant impact on the programs and mission of the BPAA. Measuring that impact is difficult. But certainly the lack of rest rooms must be having some impact on the general public’s willingness to attend our events and volunteer for programs at our observatory. The fact that we can accommodate only six viewers in the telescope dome at one time means that others must wait. There have been many nights when we could not allow access to the telescope dome because we did not have sufficient volunteers to escort viewers safely up the stairs. And the telescope dome is slowly rotting away and in time will not be functional. The result will be that the public will lose access to the one of the largest telescopes in the Pacific Northwest. Our planetarium dome is temporary and cannot serve the public for the more than fifty years that we envision. The fact that we can seat only twenty-five persons in our planetarium is also having an impact. We have had some show up for an overflow event and decide not to wait for the second showing. If attendees at winter public lectures have to use a cold, dark sanican, and sit in a cold meeting room for an hour, they just might not come back. What is even more disturbing is that they may tell others about the experience. The robot program has been moved to another facility because of lack of wheelchair access and sanitary facilities. We probably will not be able to expand our small telescope loan program because we do not have sufficient storage space. It is clear that the BPAA cannot expand its operations without addressing its capital facility needs.

Total Viewing Nights Limited

Cloud cover in the Pacific Northwest limits the total number of nights suitable for telescope use. On average, clear sky nights are less than fifty per year. In addition, planning public events to showcase celestial objects is difficult. The planetarium projector with its temporary dome has improved our ability to bring astronomical educational events to the public even when the weather is not favorable, but at the current time we are limited in our ability to offer the public real time viewing experiences. And the lack of favorable viewing conditions has made our ability to offer the community professional amateur collaborative research projects impossible. The BPAA does not have a remote site robotic telescope system that could solve the problem we have with cloudy weather.
Capital Improvements

Introduction
The BPAA Capital Project Initiative is divided into two Phases. Phase I addresses immediate needs and is directed at improvements to the existing Ritchie Observatory. In Phase II we propose to create an astronomical discovery center with the construction of an additional structure that will contain spaces for educational exhibits, storage, an additional rest room, and a planetarium auditorium hall that will seat 45-50 visitors. Phase II also includes improved access to the Ritchie Telescope Dome via exterior stairs and entryways, upgrades to the exterior walls of Ritchie Observatory, expanded parking, landscape improvements, and art work that reflects the purpose of the Ritchie Observatory.

Phase I

Telescope Dome Replacement
We can solve the problems of the existing dome by replacing it with a 24' 6” steel dome manufactured by Ash Domes of Plainfield, Illinois. The building would be modified so that entrance and exit to the dome would be from below, rather than up a ladder through the shutter. These two changes would solve all the most important problems with the existing dome. The two drawings show the existing dome on the left and the proposed new dome on the right. (The dome is shown as partially transparent to make it possible to see the interior space.)

The new dome is a hemisphere, while the existing dome comprises most of a sphere with the floor in the existing dome down where the sphere has a smaller diameter. The difference means that the new dome has far more floor space than the existing dome, and the floor space is on a single level. With more floor space we can safely accommodate larger groups in the dome. The level floor also eliminates much of the climbing up and down steps that is necessary in the existing dome, making it easier and safer to use. It would be difficult to overstate the importance of this in a dark crowded dome.

Another difference is that, in the new dome the floor is higher even than the green upper floor, or ledge, in the existing dome. That means the ladder used to reach the eyepiece can be shorter.

A third difference is that the entry to the new dome is through the floor, in the manner used by astronomical observatories around the world for many decades. This allows us to do without the steps up the inside of the hatch that covers the lower end of the shutter and the precarious journey up and down those steps. This completely eliminates the hazard of tripping while leaving the dome and falling over the railing to the ground thirty feet below.

The proposed new dome is made of steel. This means the end of the problems with rot and the need for frequent painting that are inherent in a wood dome. The extra floor space and higher floor mean it becomes possible to use a movable ladder in place of the permanent ladder installed in the existing dome. This would eliminate the threat of the ladder crashing into the telescope. Since we would also be eliminating the hazard of visitors standing on the roof, it would become safe to synchronize movement of the dome with the telescope movement.

The shutter in the new dome is just under six feet wide instead of the three-foot-wide shutter in the existing dome. This means not only that tracking would become easier, but also that we could mount an auxiliary telescope with a camera on the side of the main telescope. We could then lead the camera signal down to the ground floor where visitors could see, on a screen, what the telescope is pointed at.
Observatory Roof Modifications
To accommodate the steel telescope dome and provide access for the viewing public, we will have to cut the roof for stair access, construct a dome support structure, remove the existing doghouse and an area of repaired roof, and construct a stairwell leading into the dome from the library area.

Addition of Rest Rooms
We plan to convert the current storage/office space on the first floor of the Ritchie observatory into a unisex rest room. The rest room will contain a simple commercial grade wheelchair-accessible toilet and sink. Lighting and fan ventilation systems are also included in the cost estimates. Septic tie-in to an existing septic drain field will require approximately 100 feet of ditching and may require a pumping system.

Improved Heating System
We will replace the oil furnace with a commercial grade heating/cooling system using an air-source heat pump exchanger with an electric furnace backup for temperatures below efficient heat exchange levels, and also replace ducting and heating/cooling distribution systems to provide more even distribution of heat. The automatic system will maintain the Observatory at a constant temperature year round. The heat exchange unit will be outside.

Improved Lighting Systems
We propose better lighting systems and fixtures for the library, workshop, back stairs, entryways, and the main meeting room. Each area has particular requirements. We plan to replace the ceiling light bulbs in the library with efficient lighting fixtures that provide good light levels for reading and office work. The workshop area has high ceilings and will require high bay-types of fixtures. We intend to provide sufficient light for safe use of the stairway and design entryway lighting fixtures to spotlight key exhibits. Because white light destroys night vision, we are planning lighting systems that we can switch to red light during events when telescopes are in use.

Interior Wall Finishing
Many areas in the Observatory have unfinished walls or walls that have water damage. In some areas there is no insulation. We plan to insulate, sheetrock, tape, mud, texture, and paint unfinished walls with colors and designs that reflect the purpose of an astronomical observatory.

Entryway Improvements
We will redesign the entryway to reflect the history of the Battle Point Astronomical Association and the Ritchie Observatory and provide an exciting introduction to the Observatory, using track lighting to highlight historical and astronomical exhibits, and finishing the floor with ceramic tiles with astronomical designs. A large flat screen monitor showing a series of images of astronomical objects, accompanied by ‘space-themed’ music will be a centerpiece.

Flooring and Stairway Improvements
We want to finish the back stairway leading up to the workshop area by covering the stairs with commercial grade carpet, replace existing library flooring with wood laminate flooring, and replace main meeting room flooring with commercial grade carpet appropriate for a meeting room that also functions as a public planetarium. The rest room will have tile flooring matching the counter tops. The entryway flooring will be ceramic tiles with astronomical designs. The workshop area floors will be covered with appropriate commercial grade flooring appropriate for workshop use.
Construction Permits, Drawings, and Construction Administration.

The improvements we are proposing for the Ritchie Observatory will require many skills that BPAA volunteers lack. For the construction to proceed smoothly and in a timely manner we will need funds for professional management of the construction improvements described above. This line item also includes funds to procure permits and develop engineering drawings and specifications from concept drawings and narratives.

Contingency

We have been advised by our architect to include a 15% contingency for unforeseen or unanticipated costs.

Summary Estimate of Phase I Cost

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest room construction and fixtures</td>
<td>7,500</td>
</tr>
<tr>
<td>Septic drain field tie-in</td>
<td>15,000</td>
</tr>
<tr>
<td>Observatory Modifications: saw cutting roof, dome support structure, and spiral stairs to dome and enclosure</td>
<td>50,000</td>
</tr>
<tr>
<td>Construction permit, drawings, and construction administration</td>
<td>25,000</td>
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<tr>
<td>Telescope dome and installation</td>
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</tr>
<tr>
<td>Heat pump system</td>
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<tr>
<td>Lighting Improvements</td>
<td>10,000</td>
</tr>
<tr>
<td>Interior wall finishing</td>
<td>3,000</td>
</tr>
<tr>
<td>Entryway improvements</td>
<td>5,000</td>
</tr>
<tr>
<td>Flooring and stairway improvements</td>
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</tr>
<tr>
<td>Remote observatory equipment</td>
<td>30,000</td>
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<tr>
<td>Subtotal</td>
<td>302,500</td>
</tr>
<tr>
<td>15% contingency</td>
<td>45,375</td>
</tr>
<tr>
<td>Total</td>
<td>347,875</td>
</tr>
</tbody>
</table>

Phase II

Introduction

Our vision is to provide a astronomical discovery center that will be an asset to the citizens of the community for decades to come. We propose to add infrastructure that will allow us to expand our mission by adding to our planetarium capacity and quality by constructing a planetarium facility with an advanced planetarium projection system and design. This addition to the Ritchie Observatory will be capable of seating approximately fifty. We also propose to expand our real time astronomical viewing time from 50 to 250 nights per year. The improved infrastructure will give us almost unlimited opportunities to expand our educational programs, astronomical viewing events, and collaborative research programs with professional astronomers.

Remote Observatory Capability

Part of the vision of the Battle Point Astronomical Association is to provide real time visual access to the night sky 250 nights per year. Pacific Northwest weather makes this impossible locally. However, advances in broadband Internet communications make it possible to place a robotic CCD camera equipped telescope in an area with clear, dark skies. We can control this type of telescope system using the Internet to bring images into the Ritchie Observatory for projection on a large computer monitor for public viewing, education, and research projects. Although these systems are in common use and control software is commercially available, we plan to take a conservative approach, proposing to purchase the camera,
telescope mount, telescope optics, software, and communications equipment and build a prototype remote observatory system for testing at a local site. Once the system is proven we will move it to a site somewhere in the Southwestern U.S. with better weather conditions for viewing. When this system is operational we should have almost unlimited opportunities for expanding our educational and public viewing events, and for the first time we will be able to engage in and sponsor professional/amateur research programs, and discovery and survey programs.

Planetarium Building Addition Plans

Site Plan

The Site Plan projects an overall view of the project as seen from above. The planetarium addition is shown as a wedge shaped structure attached to the current Ritchie Observatory. In anticipation of the need for additional parking ten additional parking spaces have been added to the west side of the site. To provide a hard permeable surface the spaces will be constructed with grasscrete (grassed cellular paving). A paved walkway extends from both parking lots to the entrances of the Observatory. To the north six concrete observing pads for smaller portable telescopes, especially useful for “Star Party” public viewing events, surround a solar clock sculpture.
East Elevation

The main entrance is on the east side of the building. Vertical metal siding will match the metal siding in the dome support. In the current configuration the planetarium dome will protrude above the roof line and will be finished with a white metal covering. Other designs and configurations are under consideration that would require that the dome be tilted at a 45 degree angle. An observation window is shown at one corner. Exterior stairs provide an entryway to the second floor of the Ritchie Observatory and the telescope dome.

South Elevation

This view shows the parapet and stairs that will provide access to the 2nd floor of the Observatory. The parapet and the
lower portion of the Ritchie Observatory will be finished with matching fiber resin panels. Concrete sides of the upper portion of the Observatory will be sand blasted to produce a smooth uniform finish.

**North Elevation**

The north elevation view features a glazed picture window to the left of a rear exit door. An additional picture window can be seen on the north face of the parapet.

**West Elevation**

Visitors approaching the Observatory complex from the west side will see artwork on the upper walls that represents the facility’s purpose, designed and produced by local artists.
Section at Planetarium

This conceptual drawing shows details under consideration for the planetarium building addition. The main entry hall will have space for astronomical exhibits and demonstrations. A Foucault's pendulum, demonstrating the earth's rotation, will be a special feature, its angular movement clearly visible from a mezzanine. The planetarium auditorium will be capable of seating approximately fifty visitors. The projection system will be permanent and positioned so as not to block views of attendees. Another planetarium dome design under consideration but not shown would elevate and tilt the dome at an angle to the viewers allowing for an Imax type of visual presentation and greater flexibility in show programming. Other spaces will provide storage for telescopes and mechanical infrastructure. The lower floor will be wheelchair-accessible.

Roof Plan

This drawing shows the construction design concepts that will be implemented to upgrade the Ritchie Observatory's telescope dome in Phase I. The doghouse will be removed and replaced with a skylight. We will cut a hole in the roof to provide access to the telescope dome from the library space on the second floor of the Observatory via a spiral staircase. The existing concrete
curbing will be removed from the roof and replaced with a steel supporting structure for the new metal dome. As a result of these upgrades, access to the telescope dome will be safer and visitor capacity increased from six to twenty.

**Second Floor Plan**

This drawing shows additional details of the exterior stairs leading to the second floor of the Observatory. The route to the telescope dome for visitors will be via these stairs, through one side of the workshop into the library area, and up a set of recycled spiral stairs. Also shown are the mezzanine and the pendulum feature below.

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**First Floor Plan**

(next page) The first floor plan shows details for both Phase I Ritchie Observatory upgrades and the Phase II planetarium addition. Rest rooms are an important upgrade to the Observatory and will be placed in the space now used for telescope storage. We will remove the oil tank and oil furnace, which should free up telescope storage space until Phase II is complete. In this dome design there is seating for 46. In the tilted dome design (not shown) there would be seating for fifty. Other design features include wheelchair access ramps, telescope storage with easy ramp access to the observing grounds, and additional exhibit areas. A rest room and mechanical room have been included. Heat pump units will be located on the exterior of the building. The original large wooded doors remain.
Art Work

Solar Clock Feature

We plan a sundial like the one pictured at left, located in Hyde Park in Tacoma, Washington for the observing area above the Ritchie Observatory. The Hyde Park sundial was designed by Tom Pulford, Landscape Architect working for Chafee and Zumwalt of Tacoma at a cost of $5,000 in 1978.

Solar Walk

We plan to construct a solar walk to demonstrate the relative size of our solar
system, placing brass spheres representing the planets along a walking path at proportional distances from a point near the Ritchie Observatory. Brass plaques will give essential information about each planet.

**Landscaping**

We will landscape the acre surrounding the Ritchie Observatory with plants and ground covers to complement the observatory and planetarium building. Specifications require low water maintenance plants with low growth habits that will not interfere with telescope operations and views from the observation areas. An automatic watering system will ensure that the grounds are properly watered during summer months.

### Phase II Cost Estimates

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<thead>
<tr>
<th>ITEM</th>
<th>Cost $</th>
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<tbody>
<tr>
<td>Planetarium Building Construction @ $200/sq foot</td>
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<tr>
<td>Observatory Modifications, saw cutting walls, stairs inside observatory</td>
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<td>Planetarium Seating Fixtures</td>
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<td>Sound System</td>
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<tr>
<td>Lighting and Security Systems</td>
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<td>Exterior Wall Finishing to Ritchie Observatory</td>
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<tr>
<td>Exhibits</td>
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<tr>
<td>Solar Clock and Walk</td>
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<tr>
<td>Parking Lots</td>
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<tr>
<td>Remote observatory equipment</td>
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<td>Landscaping, Walkways, and Observation Pads</td>
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<td>Public Art</td>
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