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Tina Briggs
Parks Planner
City of Boulder Parks & Recreation Department
3198 Broadway
Boulder, Colorado 80304

Arapahoe Ridge Park Rock Structure Review & Recommendations

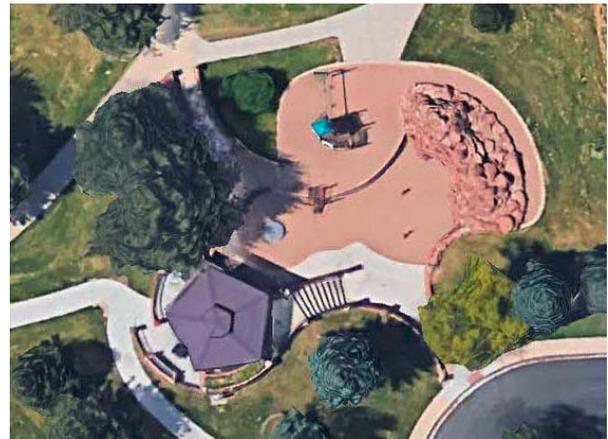
This report is intended to provide a general analysis of the existing rock structure at the Arapahoe Ridge Park playground at 1200 Eisenhower Drive in Boulder, Colorado, as well as general recommendations for improvements in terms of playability and reducing potential hazards and risks. Urban Play Studio LLC does not provide certified safety inspections of playgrounds nor structural analysis or recommendations but shall coordinate our work with the City of Boulder's CPSI and Anthem, LLC Structural Engineering.

PROJECT DESCRIPTION

The existing rock structure consists of a structural concrete slab and wall system with a sandstone climbing boulder element built over and around the concrete system. The rock climbing structure was built in 1972 as part of a larger playground including other play elements, play surfacing and perimeter walls. City staff regularly inspects the playground and the grout of the rock sculpture is periodically maintained. The City is currently in the middle of a design process to develop documents to renovate the entire playground. It is the City's desire to maintain the rock structure's existing play experiences while minimizing safety hazards and risks to users. In general, it is understood that playgrounds shall developmentally challenge children and offer varying degrees of acceptable risk.



The front or west side of the rock structure with cave



Aerial view of the playground & rock structure

REFERENCES

Engaging play environments and playgrounds are critical to the healthy development of children. Because playgrounds should offer challenges and because children use play equipment and elements in unintended and unanticipated ways, in addition to recommended adult supervision, several resources have been developed nationally to guide the design and development of playgrounds in the U.S. These resources are intended to minimize hazards and risks that may lead to injuries while balancing the need for acceptable developmental challenge. These resources include:

- The U.S. Consumer Product Safety Commission's *Public Playground Safety Handbook*
- ASTM f1487-11 *Standard Consumer Safety Performance Specification for Playground Equipment for Public Use*
- *Nature Play & Learning Places National Guidelines*, Robin Moore and Allen Cooper

It should be noted that the CPSC and ASTM guidelines and standards are written for manufactured play equipment. Though custom play elements such as the Arapahoe Ridge Park rock structure present more challenging elements to evaluate in terms of safety, the extra time and resources put into the evaluation and renovation of these types of elements offer children great benefit through unique and diverse play opportunities and experiences not commonly found elsewhere in their day-to-day life such as at schools and other typical park playgrounds.

For additional information on the theory of providing challenging play opportunities for children including acceptable risk for appropriate development, see the Nature Play & Learning Places National Guidelines. Internet searches for the topic will also lead to numerous articles and resources. The New York Times regularly features articles on children and outdoor play such as *Can a Playground Be Too Safe?*, July 18, 2011 and *On Governors Island, Mountains of Junk Where Children Find Adventure*, May 27, 2016. An adventure play space in North Wales called The Land has gained much attention this past year and offers children wild play opportunities including fire, tools and swings from trees. There is a short documentary of the same name *The Land* (2015).

It is difficult to find written policy by U.S. public park and recreation agencies that support acceptable risk in their playgrounds despite its growing popularity. This report includes several examples of unconventional and more nature-based playgrounds all of which are in public parks except for Joy Park (below) at the Children’s Museum of Denver. Portland’s Westmoreland Park is an exceptional example of a custom engineered playground constructed primarily of natural materials offering beneficial risk. In some cases, play features at Westmoreland meet CPSC and ASTM while other features offer alternative and challenging elements not compatible with these same guidelines and standards. Europe has been a leader of this concept for decades as seen in, for example, England’s play strategy policy *Fair Play* established in 2008 which it states:

The government has announced that it is working with the Health and Safety Executive and the Play Safety Forum - a group of national agencies involved in play safety - to help play providers understand the importance of offering children opportunities to take risks in their play.



Children climbing boulders at the Joy Park water feature at the Children’s Museum of Denver



An embankment slide within a boulder slope at Teardrop Park, New York, NY



The Land in North Wales offers unconventional play environments as well as wild play opportunities

It is important to keep in mind that each year hospital emergency rooms treat more than 200,000 children ages 14 and younger for playground-related injuries. In the United States' litigious society, Americans devote a great focus to the possibility of 'suing someone' including public agencies. It is therefore recommended that the City of Boulder take great care in determining the level of acceptable risk that the rock structure shall allow. A lawsuit can greatly stress a city's budget and negatively impact a community. If the renovation of the rock structure at Arapahoe Ridge playground is to be a success, the neighbors, the design team and the City must collectively determine which features are unacceptable hazards too risky for the City to be liable for, and which features offer great benefit to the community and its children with justifiable risk. The following observations and recommendations are offered for consideration to help direct the decisions of those involved; to promote a balanced consensus; and to achieve a healthy developmentally appropriate play environment for children.

EXISTING OBSERVATIONS

The existing rock structure is approximately 50'x25'x over 10' in height from the lowest ground level to the highest boulder. The structure sits within the playground that has (3) general levels including 'ground level' which is the lowest portion of the play area and has (2) spring riders, 'mid-level' in which there is also a composite post and platform play structure, and the highest or 'upper' level accessed most easily from the backside or east side of the rock structure. Retaining walls and changes in surface grades allow for the various levels and access points to the structure.

The rock structure consists of several components integral within the overall structure:

- Tiered boulders that create layers of stone stepped back and rising in height at various slopes
- A vertical face on what is considered the front of the structure or west facing side that offers challenging handholds and a void at the cave therefor being climbable to only the most skilled children
- Large and small 'caves' and openings
- Tunnels that lead from opening to opening on one level, or in some cases connecting between levels
- Drops which are openings in the rock that connect a horizontal opening with a different level of the structure and that in several cases drops directly to the ground level from a substantial height

The rock structure provides several important play experiences for physical, cognitive and social development:

- Climbing & Crawling
- Jumping
- Balance
- Sensory
- Imaginative (hiding, exploring, dramatic play)
- Gross and fine motor skills



Large & small caves and the vertical west face



Upper level tunnel

PRELIMINARY RECOMMENDATIONS

1. **Age Separation:** Due to the pre-existing conditions of the rock structure including overall height, lack of guardrails or barriers recommended for younger users, and differences in heights between level changes, it is recommended

that the structure be designated and signed for use by 5 to 12 year old users. If a natural rock play experience is desired for all ages, it can be provided with a separate and new climbing feature in the designated 2-5 year old area of the playground meeting the standards and guidelines for that specific age group.

2. **Surfacing:** After desired modifications are made to the rock structure for structural and playability improvements, the critical fall height and use zone should be re-evaluated and determined. Play safety surfacing should be installed per the critical fall height and within all use zone areas. Both engineered wood fiber and poured-in-place surfacing would be ideal choices of surfacing based on safety, cost, maintenance and accessibility when installed at the appropriate depth.

Two retaining walls exist on either side of the rock structure. The south stone veneer wall with sodded slope behind poses less of a risk than the northwestern concrete wall as the south wall sits on the perimeter of the play area. Adding a guardrail to the south wall would further reduce risk. The northwest wall is a hazard as it sits within the play area use zones with the possibility of a child being able to fall onto it. There are several ways to eliminate this wall hazard while maintaining the needed grade change such as extending the climbing structure down to the lower level with a series of additional tiered boulders. Another option would be to add poured in place (PIP) play surfacing at the mid-level of the playground and wrap the PIP around the top of and onto the face of the wall.



Retaining wall within play area and use zones



Use of barriers at Spring Canyon Park rock climbing feature in Fort Collins, Colorado

3. **Materials:** Due to the varied surface of boulders as a natural material, it is recommended that the structure be inspected for protrusions, sharp points, corners and edges. Any surface viewed as dangerous may be grinded smooth and sharp areas knocked off to reduce the hazard. In addition, the City shall continue regular inspections for loose rocks and grout maintenance repair. If the design process leads to attaching or integrating additional play elements to the rock structure such as climbing cable nets or an embankment or a wall slide, this should be done following CPSC guidelines and ASTM standards. Adding manufactured elements will introduce hardware and/or moving parts requiring an additional level of inspection.



Manufactured climbing wall with integrated slide & guardrails at Discovery Park, Wheat Ridge, Colorado



Climbing ropes incorporated into a natural boulder pile at Westmoreland Park, Portland, Oregon

4. Modifications to Existing Elements:

- a. **Large Lower Cave** – a large opening set within the structure that will be impacted most by the addition of structural elements to ensure it doesn't collapse. The structural column or similar element as recommended by the structural engineer shall be done in such a way if possible to limit the obstruction of sight lines and allow for ADA access into and out of the space. The height of the cave poses some hazard to taller users hitting their head on the upper 'ceiling' however it isn't unlike similar situations with composite structures with various height decks so no recommendations are being suggested to mitigate.

The vertical face above the cave offers little playable climbing area yet creates the highest point from which children may accidentally fall. A 38" height barrier (measured from the upper level) is recommended to close off this area and shall be non-climbable. Safer climbing routes may be maintained and even enhanced on either side of the large cave opening.

- b. **Small Caves** – small openings or caves with dead-end spaces exist both on the lower and upper levels of the structure. Those that are 'shallow caves' and not too deep offer dramatic play cubbies and should be maintained with a few modifications. Those that are deeper, especially those that turn corners where caregivers can't see children when all of the way back into the spaces should be closed or blocked off so they are shallower in depth. In all cases, it is recommended that the openings be made wider if they do not meet the minimum opening diameter of traditional play tunnels at 24" to 30". The larger openings will also allow children to be more easily removed from the spaces if they are in need of assistance or care.
- c. **Tunnels** – a series of crawl tunnels exist throughout the structure. These are recommended be modified to meet minimum width and height dimensions of 24" to 30". If longer than 5' or if a bend or turn in the tunnel exists, additional openings should be added or the top stones of the tunnels removed to allow easy access into and out of the tunnels. All horizontal openings leading to lower levels creating drops should be eliminated.



West openings, reduce size to prevent entrapment



East upper level tunnels, partially open up & enlarge

- d. **Openings** – in some cases, there are vertical face openings from the upper level that face towards the west side of the structure creating a potential hazardous drop down onto the lowest level of the playground. These openings should be closed entirely or reduced to a size that shall prohibit a child from falling through. Openings should also follow guidelines to prevent entrapment.
- e. **Tiers** – In general, the rock structure is created from a series of stepped or tiered boulders ultimately sloping towards the top area of the structure. Each step or tier should be evaluated and modified to provide an adequate yet challenging step in order to climb the structure. If the tiers are wide enough to act more like platforms, the recommended difference between tiers is approximately 18". Each rock should be inspected for stability and no movement shall exist on any portion of the structure.



Tiered boulders offer climbing challenges



Westmoreland Park's separated & lower height 2-5 year old climbing area

5. **Accessibility:** ADA requires that newly constructed and altered state and local government facilities, places of public accommodation, and commercial facilities be readily accessible to, and usable by, individuals with disabilities. Recreational facilities, including play areas, are among the facilities required to comply with ADA. It is recommended that the rock structure be evaluated for meeting ADA requirements as an individual element and as part of the greater playground.

The rock structure is currently accessible from ground level. If a slide is added and the slide access platform is at the upper level of the structure, the slide would be considered an elevated play event. Accessibility requirements shall be met to accommodate the added play event.

The opinions and recommendations contained in this report are based on observations only. There is no claim, either stated or implied, that all conditions were observed. This report does not express or imply any warranty of meeting any play safety guidelines, standards or requirements.

Respectfully submitted,

Kerry White

Kerry White, ASLA, RLA, LEED™
Principal
Urban Play Studio, LLC