

Memorandum



CITY OF DALLAS

DATE February 24, 2012

Honorable Members of the Quality of Life & Government Services Committee:

TO Angela Hunt (Chair), Sandy Greyson (Vice Chair), Mónica R. Alonzo, Dwaine Caraway,
Carolyn R. Davis

SUBJECT Children's Garden Development at the Dallas Arboretum

Attached you will find material for the "Children's Garden Development at the Dallas Arboretum" briefing that will be presented to the committee on Monday, February 27, 2012. This presentation will be made by Mary Brinegar, President and Chief Executive Officer, Dallas Arboretum and Botanical Society Inc.

If you have any questions or require additional information, please let me know.

A handwritten signature in black ink, appearing to read "Paul D. Dyer".

Paul D. Dyer, P.E., Director
Park and Recreation

cc: Honorable Mayor and Members of the City Council
Mary K. Suhm, City Manager
Thomas P. Perkins, Jr., City Attorney
Craig D. Kinton, City Auditor
Rosa A. Rios, Acting City Secretary
C. Victor Lander, Administrative Judge
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Joey Zapata, Assistant City Manager
Jeanne Chipperfield, Chief Financial Officer
Stephanie Cooper, Assistant to the City Manager

THE RORY MEYERS CHILDREN'S ADVENTURE GARDEN

SUMMARY INFORMATION

1. Description of Project

The Dallas Arboretum, a 66 acre botanical garden on the shores of White Rock Lake, is widely recognized as one of the leading display gardens in America. But few realize that it is also a world-class educational facility teaching life and earth science to 98,000 children annually. Now we are on the verge of becoming even greater, as we move forward with plans for a children's science garden that is so challenging, so grand and so magical that it will set the gold standard for children's outdoor educational facilities in the world.

The Rory Meyers Children's Adventure Garden is designed to address the national and state life and earth science education standards. It is an eight-acre laboratory where children will be immersed in nature and can make real world connections with the life and earth science concepts they are being taught in school. This garden will be aesthetically beautiful – a hallmark of the Dallas Arboretum – as we believe that urban children need exposure to the beauty and wonder of nature. It will also truly be an adventure with sixteen outdoor and indoor "learning rooms," each designed around a key science theme with over 150 interactive exhibits throughout the garden.

2. How This Garden Will Benefit Children

Science scores of American children are the lowest of all academic areas tested, with earth sciences the lowest of all. U.S. Senator Kay Bailey Hutchison, Honorary Chair of the Rory Meyers Children's Adventure Garden, cites the influential 2005 report *Rising Above the Gathering Storm*, organized by the National Academy of Sciences, as support for the need for this garden:

"It basically said that our education system is not keeping up, that by the year 2025, 90% of the engineers in the world will live outside of the United States," Sen. Hutchison notes. "And it was determined in the report that if our education system is going to keep up with the needs for our country, we have to interest children – at a much earlier age – in science and engineering and math."

In October 2010, the *Dallas Morning News* published an article titled "48% of Fifth-Graders Not Ready for Middle School." To be considered ready, fifth-graders had to pass the TAKS exams in reading, math and science. The situation worsens in middle school as science TAKS scores continue to drop. Fourteen of twenty-two low-performing middle schools were failing to move ahead on the state's report card for schools because their students failed to pass the science portion of the TAKS test.

This eight-acre learning laboratory will address and enhance national and state life, earth and environmental science education standards in a manner not possible in a classroom. It will immerse our urban children in nature, encouraging them to explore and investigate and bring understanding to textbook lessons. This multi-generational garden will also provide fun and rewarding experiences for families and improve children's attitudes about nature and science. The garden will be so large, complex and packed with interactive exhibits, activities and adventure that children will want to return again and again, and each time they return they will deepen their understanding and appreciation of our world.

OBJECTIVES

1. Program Objectives

The Rory Meyers Children's Adventure Garden will:

- Reinforce and enrich national and state life, earth and environmental science education standards for pre-school through seventh grade in a manner not possible in a classroom. The design includes active learning and experimentation, real world connections with the science concepts and immersion experiences surrounded by nature, all facilitated by degreed teachers and trained docents that help children make sense of what they are seeing and doing. These outdoor learning rooms are developed with multiple levels within each concept so that multiple age groups will be engaged and challenged.
- Develop a beautiful garden and fun and challenging programming that connects children with nature, improving their attitudes and behavior related to science and the environment. Because of the highly urban lifestyle of inner city children in Dallas County, many of the children we reach are disconnected from nature with no interest or involvement in the outdoor world. Our objectives include promoting concern for the environment and greater understanding of life and earth sciences by teaching young people through instruction by degreed teachers, hands-on activities and by using real world materials. The garden is designed to showcase the beauty and complexity of nature with features, exhibits, activities and programming that engage children emotionally with nature. The programming is also designed to help children understand that their behavior has an impact positively or negatively on the environment.
- Provide focused science support to underserved children in the area's lowest performing schools. The Arboretum has a strong, focused commitment to supporting low-performing schools and economically disadvantaged children. These schools are typically in highly urban areas that serve children in the lowest socio-economic strata. These children are the most likely to have no opportunities to experience nature first hand. We currently provide some financial assistance to approximately 60% of the 98,000 school children we see annually in a variety of ways: free admission, free programming, discounted admission, bus stipends, classroom materials and supplies, free curriculum support and free teacher training. We will continue this level of support with the addition of the new children's garden. We will utilize its outdoor learning rooms to give context to the science concepts which they are taught in school.
- Provide support for teachers of science. Most elementary teachers are not trained specifically in science. Many do not have the skills, content understanding or confidence to teach science with excellence. We currently have a very successful science teacher training program and began working this year with DISD elementary and middle school science coaches. We also began this year to expand this program to teachers in suburban school districts. With the Rory Meyers Children's Adventure Garden, we will be able to greatly expand that reach and will have a seven acre laboratory to demonstrate and teach interactive, inquiry and project based academic design to science teachers. "Teachers are not generally trained well in teaching elementary science," says Dr. Linus Wright, former Superintendent of the Dallas ISD and a former Undersecretary of the U.S. Department of Education. "And so this is an opportunity not only for students but for teachers to get excited about science and how they can excite students about science. Really, the lack of science knowledge has become a national priority. We have fallen far behind other countries in scientific development." We also have a contract with Southern Methodist University's Simmons School of Education to work together to develop teacher in-service programs and to help train their graduate and undergraduate students through internships utilizing the children's garden.
- Provide an enjoyable and rewarding educational experience for North Texas families in a fun and beautiful environment. The site chosen for the children's garden is adjacent to the Camp House lawn with a panoramic view of White Rock Lake. There is a thirty foot elevation drop

from the garden's Entry Plaza to the Wetlands at the foot of the hill. This provides the opportunity for terraced learning rooms, dramatic waterfalls, a skywalk, grottos and caves. The Dallas Arboretum is a world-renowned display garden. The children's adventure garden is designed in that same manner and will surround children and their families with nature's beauty and with exhibits and programming so imaginative and fun that families will return often.

- Increase the visibility of Dallas regionally and nationally. This garden has been thoroughly researched and meticulously planned. The design team was selected from over 100 candidates after a nationwide search. The garden will be unique in the world, and a local, regional and national marketing plan is being developed and implemented. It will become a "day one" destination for out of town visitors and will have strong economic impact for our city.

2. The Activities That Will Be Conducted to Achieve the Desired Objectives

The Rory Meyers Children's Adventure Garden is an approximately eight-acre garden designed into sixteen primarily outdoor "learning rooms." Each of these is designed to address the national and state science education standards for life, earth and environmental science. These zones are age specific, as are the standards, but not age-restrictive, so all are welcome in any area of this garden. These learning rooms include unique teaching and demonstration areas, over 150 interactive exhibits, water features, gardens based on program objectives, woodland areas and architectural features.

The sixteen learning rooms are:

- The Entry Plaza – a welcoming and orientation area large enough to accommodate 200 people with shaded amphitheater seating and the first bird's-eye view of the garden.
- First Adventure – a walled garden for our youngest visitors to play in nature with nature. It will be filled with safe and enchanting features including a maze, potting shed, tree house, babbling brook and plant petting zoo.
- The Incredible Edible Garden – Vegetables, grains and interactive exhibits help our urban children learn that our food comes from plants. They will learn about good nutrition, the multicultural aspects of food and economic botany.
- The Orchard and Vineyard – This area will be a beautiful extension of the Incredible Edible Garden teaching that food also comes from trees, shrubs and vines.
- Plants Are Alive – an inside look at the life of plants that will help young children explore and discover how plants live and grow.
- Kaleidoscope – the world of patterns, shapes and structures – a horticulturally beautiful area that will integrate science, math, art and architecture.
- The Oasis – a rooftop display garden that will be beautiful in every season. It will offer a lovely high spot in the center of the garden to relax and view the nearby learning rooms. Programming will change with the horticultural display.
- The Skywalk – an elevated walk through the tree canopy in the heart of the children's garden where visitors will discover the benefits of trees and who lives in the tree tops.
- Pure Energy – Here, children investigate the energy we get from natural sources: wind, sun and water and how we transform them into energy for our use.
- Habitats – a 500-linear-foot trail through a woodland habitat and over streams where children will learn about the interconnections among people, plants and animals. An adventure bridge, 30-foot tree snag and canopy walk above the habitat trail will add excitement and challenge.

- Living Cycles – a learning room all about change and the circle of life from changing seasons to a plant's life cycle to decomposition.
- Earth Cycles – Children will actively explore a cave, rock and water cycles, a weather station, fossils and the solar system.
- The Amazing Secret Garden – a maze with engaging rewards along the way to find the secret garden. Removable panels will make the maze more or less challenging for different age groups, and questions at turning points will help speed children to their goal.
- The Walk on the Wild Side – a discovery trail along the switchbacks with hints along the way to help visitors guess which native animal or plant is hiding around the next turn.
- The Discovery Center – a 9,100-square-foot building that will employ innovative exhibits and interactive technology to engage children in all aspects of life and earth science exploration.
- The Wild Wetlands Walk – a wetlands ecosystem experience that will feature floating bridges, boardwalks through grass tunnels and a secluded wildlife blind where children can discover the adaptations of plants and animals to living in a wetland environment.

The activities that will be conducted within each of these learning rooms are very extensive. We will give more detailed examples of two of the learning rooms as examples.

The Wild Wetlands Walk

This is our largest learning room and is 31,000 square feet, which is almost three quarters of an acre. Its large size helps to immerse children in a completely different ecosystem. They will walk on boardwalks through grass tunnels and observe and investigate the adaptations of plants and animals to living in a wet environment and learn the value of wetland ecosystems.

The Wetlands Exploration Island can be reached across either of two bridges and will be staffed seven days a week. Young children will do pond dippings to see what is in “real” water where fish and bugs and frogs live. Older children will use electronic probes to conduct aquatic studies and water quality testing. The teaching station has a demonstration table and 60” flat panel screen so all can see the demonstrations clearly.

The Wetlands will also have a wildlife blind across a boardwalk. From one side, visitors can observe wildlife attracted to open water, and on the other side they can watch for wildlife that hunt and live in marshlands and woods.

There will be a path through the marshland where teachers and docents will lead visitors to spot wetland animal sculptures and birds, and to the site of a natural spring to learn about aquifers.

There will be eleven different exhibits and activities in this leaning room that support the goals and objectives of the wetlands. These are just three of them.

Plants Are Alive

This 26,000-square-foot learning room is designed for kindergarten through second grade. The life science focus for this age group is that plants are alive, have different parts with different functions and that when they all work together, the plant can survive and thrive. This is the beginning of systems theory. This learning room will be designed with a “Honey, I Shrunk the Kids” theme. Everything will be giant size, from the 12-foot pots of flowers at the entry gates to the 16-foot-tall flower pot in “The Works” exhibit to the four-foot hibiscus 3-D puzzle.

The I'm Alive teaching theater will have a docent or degreed teacher providing a program presentation for up to 30 children at a time. The demonstration table with a flat-panel screen overhead will allow all to see the program clearly.

In the Build-A-Flower station, the children will put together a giant 3-D puzzle of a hibiscus flower. They will put each part into the armature as a docent names each piece, familiarizing the children with the vocabulary. In this area there will be another four-foot flower puzzle of a daylily, and the children can compare and contrast the ways the flowers are alike and different.

The Works is a 16 -foot potted plant cut away on one side to reveal its roots and interior plant structures. Children can push a button to see LED lights map the water and nutrients rising through the roots to the stem and upwards to the leaves. There are four closer look stations nearby that define in more detail how the plant's parts work together.

There are nine different exhibits and activities that support the goals and objectives of this learning room, including the Plant Parts Trail where children will find living examples of the exhibits.

EVALUATION

The Arboretum and Southern Methodist University's Simmons School of Education have formed a strategic alliance to work together on the children's garden's academic design and evaluation. The SMU Education Department will work with the Arboretum Education Staff through the garden's development to create and implement an Evaluation Master Plan that is innovative and extensive. This ongoing relationship will yield research, analysis and formal evaluation reports.

Our children's garden was designed differently than other children's gardens. Most begin with the site and develop the garden. Then they determine what they can teach in those areas. The Rory Meyers Children's Adventure Garden was designed first by reviewing the state science standards and selecting those for each age group that could best be taught in our garden. We developed the learning room's educational goal and the key messages, researched the kinds of activities in which children that age liked to participate and only then did we explore what exhibits and activities would best engage children in those activities and lead to our key messages and goals. The final step was to add the plants and architectural features that support the exhibits and programming. Because we designed all of the learning rooms based on the science education standards, those clearly defined standards are the criteria on which the evaluations will be based.

The Master Plan includes three broad types of evaluation: front-end, formative and summative.

The front-end evaluation involved assessing the quality of the most successful programs and their appropriateness for our new garden's program. We evaluated these in terms of academic design including content instruction, activities and exhibits. We determined how the elements complemented and reinforced science learning and looked for areas where improvement and enhancements could be made. This front-end evaluation has been ongoing for several years. Through this process we have also evaluated our own programs using our staff educators, school teacher's evaluations and outside professional summative evaluations by Dr. Cynthia Klemmer, from Charlotte, N.C. This process has helped us develop a clear picture of our school group audience – their prior knowledge and misconceptions, and the Rory Meyers Children's Adventure Garden has been designed with that information in mind.

The formative evaluation ensures that the new programs in the children's garden will be educationally appropriate and challenging, while also engaging and effective. This process keeps the programming improving while it is evolving. This stage includes the development of prototypes, models and presentations of new lesson elements to evaluate audience response.

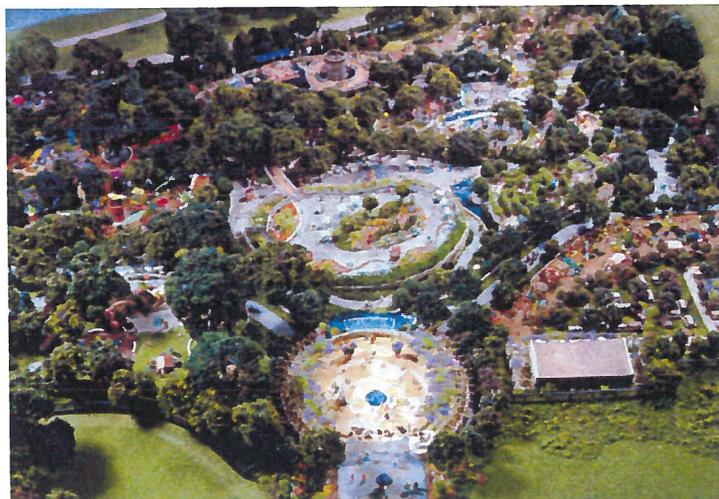
During this stage we also are utilizing our Curriculum Advisory Committee. This committee includes school district superintendents, science directors, public and private school master teachers and members of the Arboretum's Education and Research Committee. The committee reviews each learning room's academic design from goals, key messages and objectives to the signage, exhibits, plants and features and recommends modifications. After this review, the Scientific Advisory Committee chaired by Dr. Johann Deisenhofer, who received his Nobel Laureate for his contribution to the understanding of photosynthesis, reviews the learning room. This committee focuses on scientific accuracy, rigor and possible enhancements. Our partnership with Southern Methodist University also provides us with professional educators who act as a filter as well as advisors on every aspect of the academic design.

The summative evaluation will occur after the adventure garden opens. It will assess the effectiveness of all aspects of the garden in meeting its goals and will inform improvements and modifications. This phase of the plan includes both qualitative and quantitative methods. Qualitative evaluations, emphasizing the depth of understanding, will include sample groups, interviews, focus groups and open-ended surveys. This data will provide a rich picture and anecdotal examples. However, it is subjective and less quantifiable. Quantitative evaluations will also be used. These will include experiments, pre-and post-test score comparisons, observations, surveys and categorical questions. These quantitative evaluations use number-based methods to generate statistical proof. They are, therefore, more objective and generalizable to other similar groups. Both methods will be used to give us a balanced and rich evaluation plan.

The Rory Meyers Children's Adventure Garden



Civic Leader Rory Meyers



Overview of the Rory Meyers Children's Adventure Garden



Vista of the Incredible Edible Garden



Rendering of Plants are Alive Area



Rendering of the Wild Wetlands Area



The Rory Meyers Children's Adventure Garden Entry Plaza



Dallas Arboretum
Let nature nurture you.

To obtain these photos in jpeg format,
contact **Terry Lendecker** at **214-515-6521**
or email tlendecker@dallasarboretum.org

*The Dallas Arboretum is a non-profit organization that is supported, in part,
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