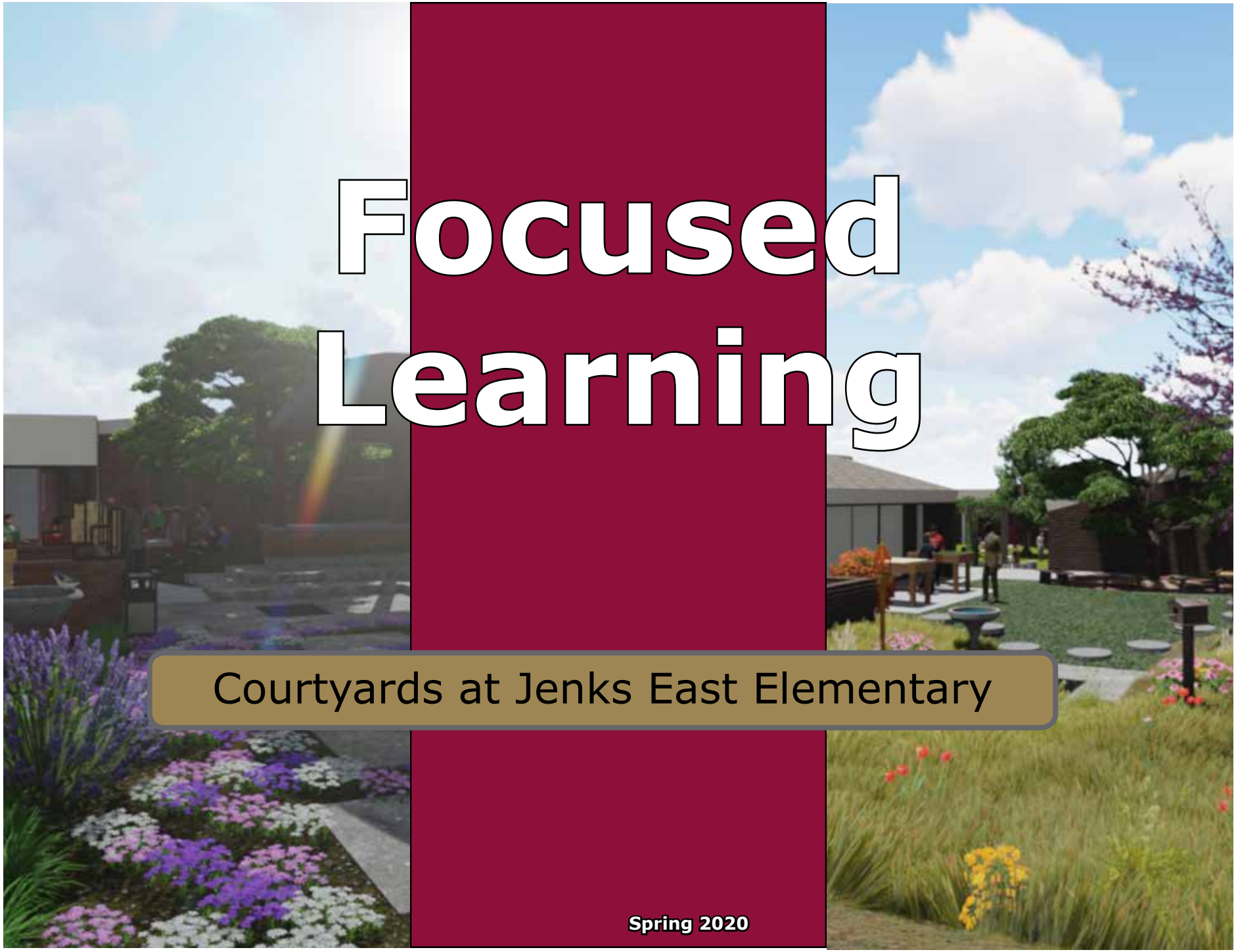

Focused Learning

Courtyards at Jenks East Elementary

Spring 2020

THE UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

FOCUSED LEARNING: COURTYARDS AT JENKS EAST ELEMENTARY

A PROFESSIONAL PROJECT

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF URBAN DESIGN

By
TRISTAN JAMES FOX

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FOCUSED LEARNING: COURTYARDS AT JENKS EAST ELEMENTARY

A PROFESSIONAL PROJECT APPROVED FOR THE

URBAN DESIGN STUDIO

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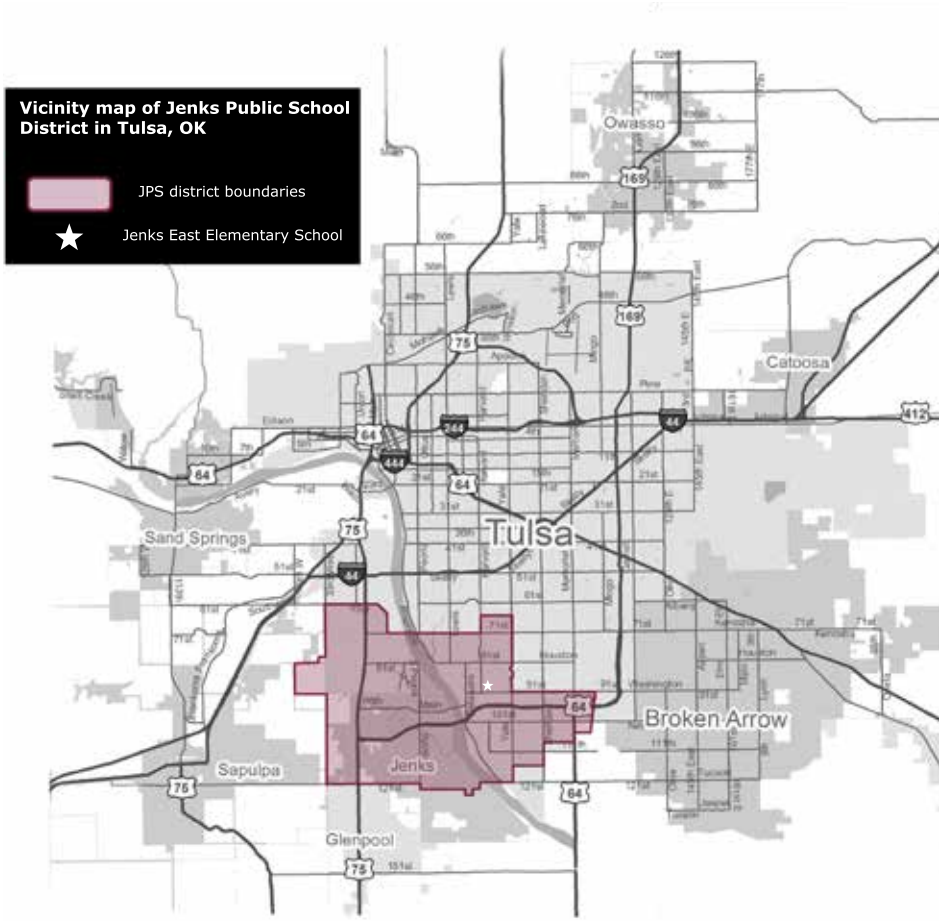
INTRODUCTION

In the summer of 2019, representatives from Jenks East Elementary School in Tulsa, OK visited the OU Urban Design Studio to offer several projects to the second year masters students. Ryan Glaze, Site Principal at Jenks East Elementary School, and Erin Parks, Community School Coordinator at the same facility, pitched several ideas to the students for interesting changes being considered on their campus. These included the revitalization of a walking trail through part of the campus with historic and cultural significance, an examination of the school's playgrounds with an eye for adding more natural play elements into the landscape, and redesigning two interior courts to be more beautiful and useful for students and staff.

Of these, I was drawn to the courtyard project because it allowed the opportunity to design for many different user groups. The student populations using each court had very different developmental needs from each other, and the teachers and administrators who were my primary stakeholders had still different concerns. Working to create a design that could please all these groups would allow me to further develop my skills as an urban designer.



Jenks Public School District is located to the Southwest of the city of Tulsa, and encompasses the municipality of Jenks as well as parts of South Tulsa. It enrolls over 12,400 students from over 40 square miles on both sides of the Arkansas River.

Jenks East Elementary School sits at the corner of South Harvard Avenue and East 91st Street in Tulsa, OK. It sprawls across a large campus which it shares with its associated intermediate school. The buildings, playgrounds and parking lots cover roughly 35 acres. East Elementary currently teaches nearly 1600 students that speak over thirty different languages. It employs 116 teachers with over 70 administrators and support staff to ensure that its students get the best care. It is divided into six main buildings (A-F) plus the gymnasium. The courtyards examined in this project are located in Building A and Building D (see map), where they might be used by students from kindergarten all the way through fourth grade.

Courtyard A
site analysis

Building A on the Jenks East campus is used by students ranging from kindergarten to second grade. The courtyard in building A is 64’-8” by 47’-0”. It is accessible from the entry lobby to the Northeast, and a connecting hallway to the Southwest. Views into the space are possible from four separate classrooms, the learning center, and the aforementioned lobby and crossway.

The court is predominantly characterized by two features. The first is a brick air conditioner screen that rises nearly seven feet tall due to the considerable elevation change which transects the space. The second is a wide, stepped concrete seating area around the central drain. This wide basin constitutes the majority of the useable space within the courtyard, but is lacking features which might give it an understandable function or purpose.

The landscaping in the space is fairly overgrown, although it is clear that considerable effort was put towards it at one time. Many of the plant species are decorative and would have been quite attractive when installed. The most effective specimen in the court is a large pine tree which looks healthy and provides shade. A large number of stones are also in the space, some of which have been used to control erosion, while others simply dot the landscape.

Courtyard D
site analysis

Building D is used by Jenks East Elementary's third and fourth grade students. The courtyard in this building is roughly twice the size of the one in Building A, at 141' long by 47' wide. This considerable space is bisected by a narrow corridor in the middle. It is accessible from the entry lobby to the north and connecting hallways to the northwest, southeast, and south. The space is visible from windows located at all of these locations as well as from eight different classrooms along its perimeter.

Courtyard D has largely remained untouched, with the exception of a few small features. A gentle grassy slope descends from north to south along the length of the space, with a six foot difference from end to end. There are two well established pine trees which provide much needed shade and a large redbud which, although fairly overgrown, has a nice canopy and provides shelter for birds.

The lack of infrastructure belies multiple efforts to improve the court, which can be seen in what remains of bird baths and feeders, as well as a large area defined for a garden. A concrete slab was also recently poured in the space, for the purpose of expanding the court's utility. The favorite attraction of the court for many teachers and students is a small family of box turtles which have made the space their home.

Important Early Stakeholders

My first visit to Jenks East Elementary School allowed me the opportunity to see the courtyards through the eyes of its teachers and students. I was also able to sit down with the two idividuals who had visited the studio to gain a better understanding of them and what they hope to accomplish through this project.

Ryan Glaze is the Site Principal at East Elementary and has since taken on the interim role overseeing the adjacent intermediate school. It is clear from even a very short meeting with him that he takes this role very seriously and is always on the lookout for things that might improve the experience for the teachers and students in his care.

Erin Parks is the Community School Coordinator at East Elementary. Community schools seek to not only engage their students during the confines of the school day, but also provide programming for the parents of their students and adults in the surrounding neighborhood. Mrs. Parks is great with coordinating with people to encourage their strengths and is always thinking ahead to the next three projects. She sees the potential that the courtyards have for new modes of teaching and for the after school programming that she oversees.

Principal Glaze and Mrs. Parks also introduced me at this meeting to two teachers that would become integral to the project and invaluable for their knowledge and passion for updating these spaces.

Lisa Allen is a kindergarten teacher in Building A. For multiple years, she has been working at building support and momentum to invest in Courtyard A. She is most excited about the prospect of having more natural elements that will encourage wildlife and will allow the children to learn about the world through observation. Early last year, she collaborated with the OSU extension service and a class of landscape architects who drew up plans for the space.

Emily Honomichl is a special needs teacher in Building D and also head liaison for the gardening club. She knows how effective the outdoors can be in calming children and the many studies which show its benefits particularly in those with special needs. She is enthusiastic about making Courtyard D a more attractive and usable space for teachers and students both for classroom lessons and in moments of reflection. She previously worked with an engineer to create a scaled plan of the space to submit to administration.

Stakeholder Priorities

The project's first official stakeholder meeting yielded many excellent results. The team conducted a P.A.R.K. (Preserve, Add, Remove, and Keep out) ananlysis to determine what should stay and what was most needed. This was also my first meeting with Lisa Allen and Emily Honomichl, and they supplied me with a great deal of information on what previous efforts had been done in the courtyards and what they and other teachers at the school were most excited for in these outdoor areas.

The meeting was also helpful in gaining a better understanding of the different needs that the administration, teachers, and students might have. Finding the common ground between them would lead to the final design for the spaces. Listening to my stakeholders, we discovered that the most requested elements for the courts all comfortably fell into one of four major categories:

- **Seating -** One of the primary concerns from the outset was to have enough seating in the courtyards to allow them to function as outdoor teaching spaces for an entire classroom.

- **Shade -** As these spaces are largely shielded from the wind and surrounded by brick and concrete, special attention must be made for shading.

- **Educational spaces -** As a school with many excellent playgrounds, the team agreed that these spaces should be foremost designed around quiet reflection and educational utility instead of play. Natural elements invite passive learning for the curious observer.

- **Low maintenance -** As the burden of maintaining communal spaces is always complicated, the stakeholders asked that any interventions require as little maintenance as possible. Any plantings should require nominal upkeep and any structures should be able to last for some time without involvement.

REASEARCH AND INFORMATION GATHERING

To begin the project in earnest, I first set about learning as much about the two courtyards as possible. I walked each court multiple times to see how they looked in different weather conditions and from different angles. Conducting a site visit after a rain event in October allowed me to record which areas might lack drainage and whether specific areas might be problematic for planting. These visits also gave me the opportunity to speak with some of my stakeholders individually and take measurements of the spaces to more accurately represent them in future renderings. Many photographs were taken of each courtyard so that specific details could be recalled later and represented accurately.

It was also important to look at previous attempts that had been made to design these spaces and how they were constructed. The former allowed me to gain insight into what others had perceived as important and unimportant about the projects and how to avoid some potential pitfalls. The latter was integral to understanding the courts from a technical standpoint and how to integrate my designs so as to compliment and not conflict with the established order. To this end, I sought out the building construction plans and every element connected to the courtyards in Buildings A and D.

These examinations led to the creation of a full three-dimensional model that allowed me to view potential interventions from any angle. The advanced modelling software also made use of the real world coordinates of each court to simulate the sun's lighting and shade throughout the year. This data would be very useful in preparing the planting selections for the project.

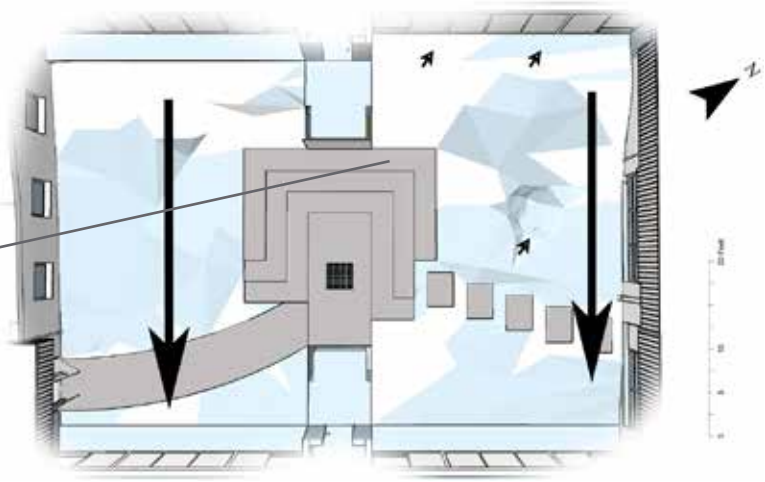
Finally, it was important to research how to best design the space for the particular users at Jenks East Elementary. I had already spoken to two administrators and had an idea of what they wanted, but there were also considerations of what would be most beneficial to the teachers and what would be most pleasing and resistant to the explorations of the young students. To answer these questions, I spoke with my stakeholders, looked into what other schools had done, and reached out to the teachers to see how they felt the student's input might best be gathered. Once all of this information was available, the process of prototyping various interventions and additions could begin and the design could begin to take shape.

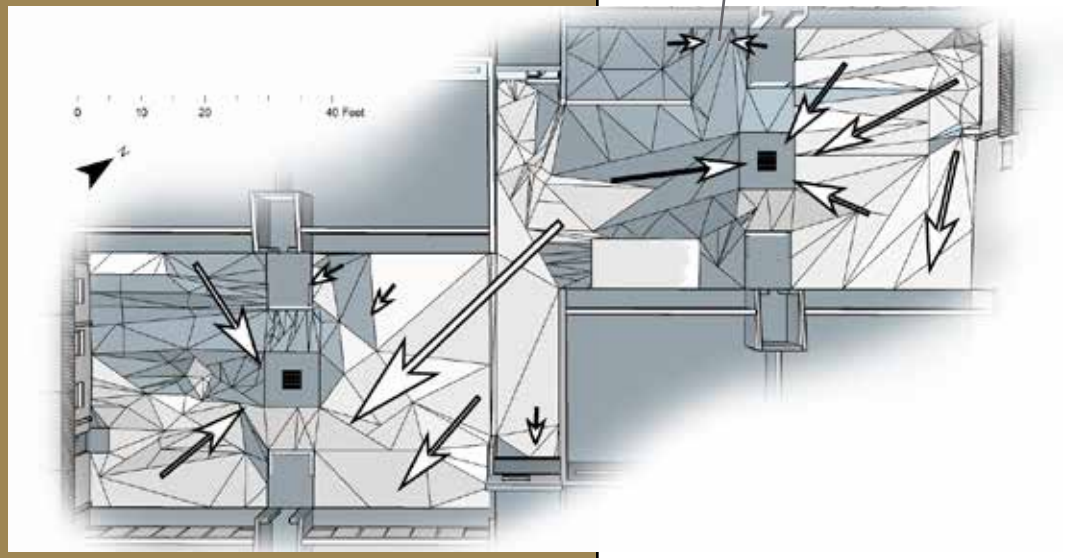
Rainwater Drainage Overview

On October 11th, I had the opportunity to walk the two courtyards again after a rain event the previous evening to assess the effectiveness of drainage systems in place to draw rainwater away from the building foundations and prevent stagnant pooling. Fortunately, the gutter system and box drains in Courtyard A and the two halves of Courtyard D are quite efficient at what they were designed for. Arrows show the flow of rainwater within Courtyards A and D.

standing water on steps in Court A

standing water on hill in Court D





Courtyard A has some muddy areas at the bottom of the hill on the Southeast side, due to runoff, although no pooling water was seen anywhere in the court with the exception of where it had been slowed down over the concrete pad by overhanging foliage.

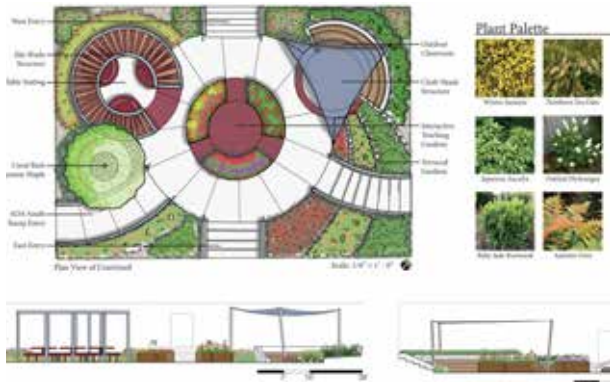
Courtyard D had slightly more issues due to the more complicated terrain in the space. Standing water was only found on non-porous surfaces around the doors and air conditioning units which had not been properly graded with the exception of a hillside in the Northern half of the court, adjacent to the constructed garden area.

Reviewing Previous Designs

One benefit from the first stakeholder meeting was that I received information on what had previously been suggested for the courtyards. Even better, Ms. Allen and Ms. Honomichl possessed detailed plans which had been drawn up for each space which they were willing to share with me.

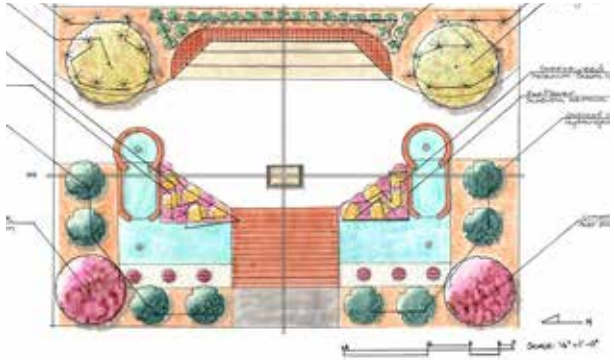
Courtyard A

The plans for Courtyard A were drawn up in Spring 2019 as an assignment by landscape architecture students at Oklahoma State University in conjunction with the OSU learning extension service in Tulsa. Many were bold and all were bright and beautiful with a spectrum of colorful plants on display. The reason that I believe none of these plans have been implemented comes down to one of the fundamental differences between this project and the one that the OSU landscape architecture students were working on. I have had the opportunity to visit with multiple teachers and



Design by Ben Levy (2019)

administrators at the school, I have had the freedom to photograph and measure the courtyards numerous times, and I have even been given access to the school's own building plans. Most importantly, I have had the time to devote to this project, and unfortunately that does not seem to have been the case for these other students.



Design by Alexander Brown (2019)

I have been told that they only saw pictures of the space, and as result many of the plans produced were left somewhat detached from reality. In many, the terrain is completely or nearly completely flat, discounting the fact that the entire school is built on a hill, and the foundations of three of the sides are on different elevations. The many colorful planting beds are beautiful, but they would all require extensive annual care and maintenance by the school,

Design by Chase Skelton (2019)

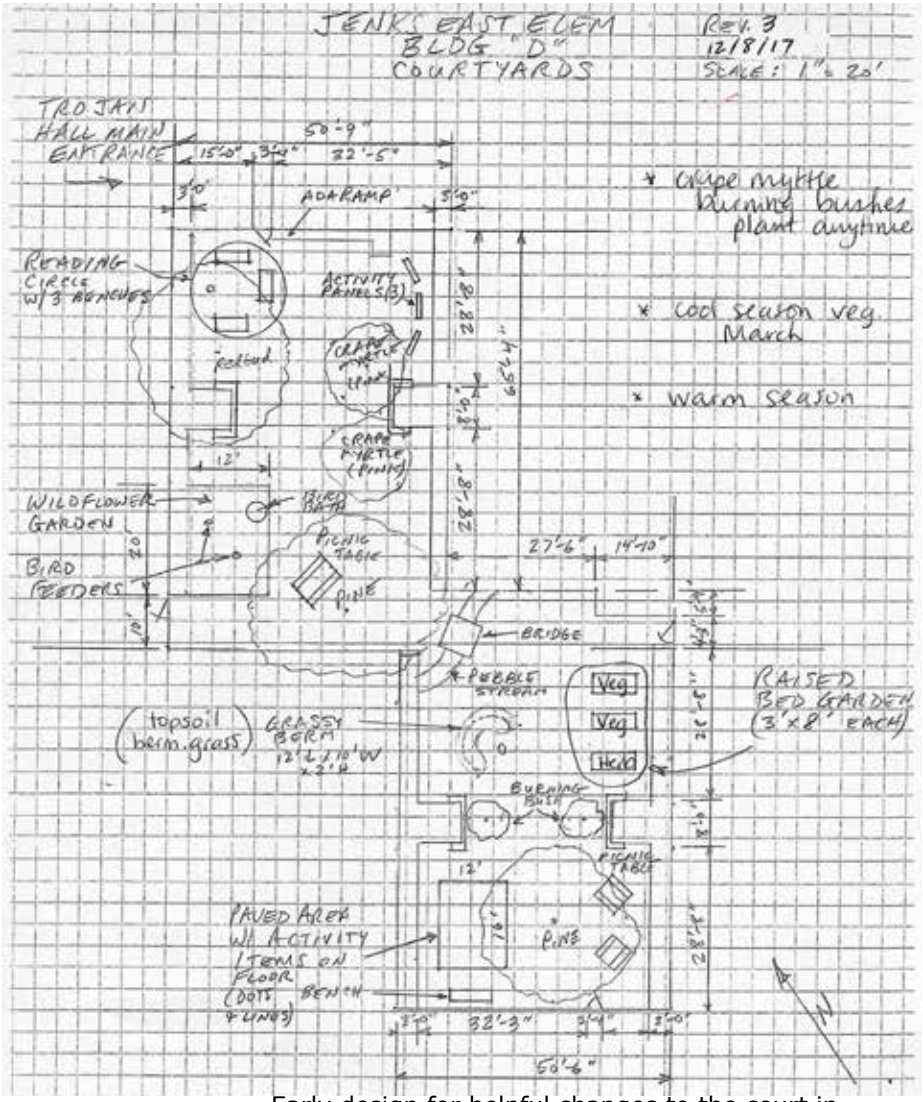
avoidance of which was one of the core ideas I was told to build my design around. Some of the plans even seem to assume that the small doors to the technical rooms are full entrances into the space, and all but one make a point to outright

expunge the existance of the air conditioner screens rather than accept them as a limitation to be worked around.

Courtyard D

The plans for Courtyard D were drawn up by Emily Honomichl with assistance from a retired engineer to properly measure and scale the diagram. The plan does a number of things very well, including modifying what is currently in the space for greater impact when not simply keeping it and working around. She has been careful to design her vision of the court around teacher and student functionality, and some quite similar elements can be seen in the final design.

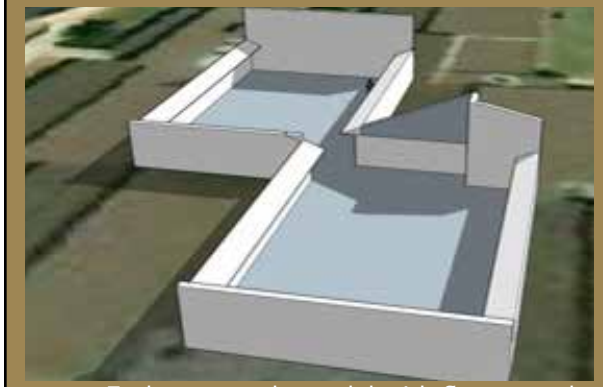
This is not to say that there are not some issues, however. Similar to how the OSU students worked, it is clear that the top-down view of the court influenced Emily. Certain segments of the plan do not work as well with the building's elevation changes, and others such as the ADA ramp location would be quite difficult to implement as designed. There are also some elements which would require a fair amount of upkeep. For these, I have striven to find analogues which will convey a similar experience.



Early design for helpful changes to the court in Building D by Jenks teacher Emily Honomichl (2017).

Assembling Accurate Site Models

As I began to design for the spaces, I realized that even my work was starting to be affected by looking at the courtyards in a two dimensional plane. My initial studies in light and shadow were certainly limited by assuming a flat ground plane. To solve this issue, the decision was made to replicate the buildings and terrain of the couryards to the most accurate degree possible.



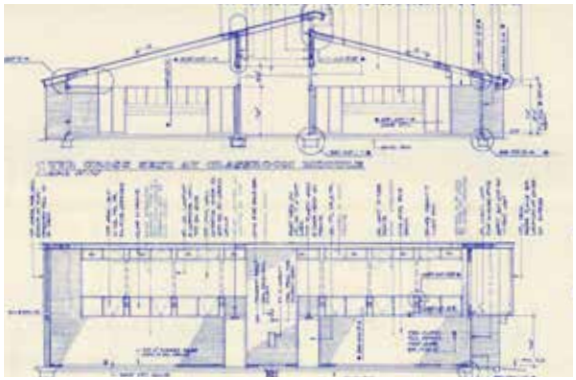
Early sun study model with flat ground plane and very basic building geometry

Physical as well as computer modeling were considered, but ultimately the choice was made to construct the model in a virtual space to more easily test the effectiveness of shade structures and explore changes to the landscaping. The process began with requisitioning the building plans, which was done via an introduction by site Principal Ryan Glaze. Jenks schools were generous to offer complete access to the original 1977 plans for the school as well as for all additions and modifications which were made afterwards. I scanned them into PDF files through the studio's plotter one at a time and began the methodical process of deconstructing the buildings into core components and measurements.

Three sections of Court D defined by recurring classroom module

Nearly every classroom in buildings A and D are identical in terms of layout. This is due to the same module of four classrooms being repeated again and again throughout the design. This accounts for much of the shape of these buildings and also why the courtyards exist in the first place. As such, modeling this important component was essential and a good place to start.

Much of the dimensional information could be found from the floor plans and elevation view drawings, although the reference guide for items such as window and door dimensions was nowhere to be found. In these instances, there truly was no other recourse besides site visits to individually measure, and



Elevation of classroom module, as seen in Buildings A and D

extrapolation from other elements that were defined in the plans or reference photographs. Through these techniques, I completed the

reference photo of 6”x4” gutter and metal roof flashing

completed model of classroom module

detail of finished model as processed through rendering software

classroom module.

With the classroom module finished, two sides of each courtyard were basically complete. The next step towards building the finished model was to set the classroom modules to their relative finished-floor elevations using the building plans as reference. From here, the other sides could be constructed using the blueprint elevations, site reference photos, and any specifically recorded dimensions.

Determining how to create the terrain inside the open boxes of the surrounding buildings came with its own set of questions. The program used to model the buildings included multiple landscape draping tools, but none that approached the level of exactness which I was hoping for. There was also the matter of how exact I might be able to get without a proper survey. Ultimately, I opted to use the data points which I had from where the terrain intersected the buildings and elements which I did have locational positioning for, and used polygonal modelling to develop the terrain using one small triangle at a time.

With the base models complete, all that remained was to apply textures and begin to model my various interventions for each location. I also imported each model into rendering software, for the purposes of applying higher picture quality textures and adding people and plantings to set the scene.

Polygonal model of terrain contours within Courtyard D, destinct faces shown

Researching the Public Building Codes

Before the design stage of the project could begin in earnest, a number of technical questions had to be answered from a simple logistic and use perspective. One of the first questions Principal Glaze had about the courtyards was about whether the frames upon which the doors are mounted would need to be reversed. This is in reference to the standard building codes used in Tulsa and throughout the nation which require interior doors to open outwards as a preventative measure in case of fire. Beyond this, there were other questions which needed to be answered, including how many people might be allowed in a courtyard at one time, and whether there were other precautions which would need to be planned around.

I proceeded to research the international building code (IBC) for the most recent year which I was able to access the full text for (2009), and then cross-referenced my findings with the IBC 2015 edition, which the city of Tulsa adopted in 2018. Information on courtyards of the size and type at the schools is not extensive. There are considerable guidelines for egress courts which connect to a public way, but concerning courtyards which exceed the minimum allotted size, information is quite sparse. The courts are subject to section 1206.3.3 on drainage: "The bottom of every court shall be properly graded and drained to a public sewer or other approved disposal system complying with the international plumbing code (International Code Council 2009, 273)."

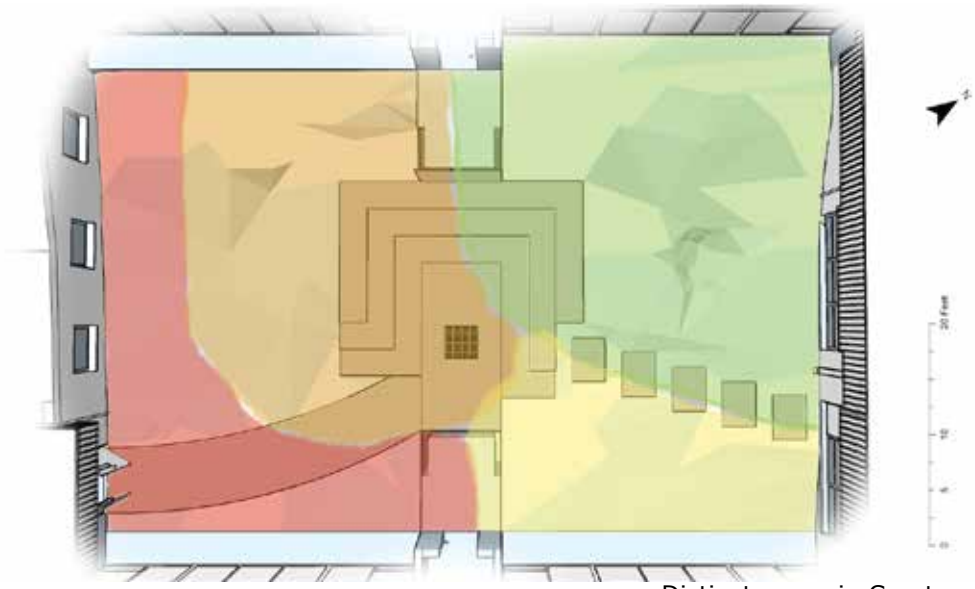
In respect to the doors swinging into the courts, the answer becomes decidedly more murky. The doors were most likely built to swing inward to prevent blocking of the corridor, similarly for fire escape purposes. While these courtyards would likely be constructed differently today regarding the doors, there is little doubt that at the time they were constructed (1977), the buildings were in full compliance of the building code and will thus be grandfathered in as acceptible unless significant changes are made to them. The interventions recommended in this report should not exceed this threshold as the structure itself is not being altered.

Regarding how many people may be allowed in each court at a time, the simple answer is to plan conservatively. A single class group should not exceed the occupancy for either court though, and Courtyard D is large enough to allow for two groups to pass through at the same time with no issues whatsoever (International Code Council 2009).

Results of Sun Studies in Courtyard A and D

With the completed three dimensional models of the two courtyards, it became possible to conduct a fairly accurate sun and shade study of the courts. These studies light the models dynamically using gps data to approximate the real world lighting conditions for a location and enable more accurate landscaping. Using publically available GIS data, I recorded the coordinates for Courtyard A (36.034110N, 95.938996W) and Courtyard D (36.034271N, 95.937054W). These coordinates were input into the rendering software where the terrain, trees, and building outlines guide affect the amount of shade in each court over the course of the day and year. All direct and partial sun measurements were taken at ground level.

The study of Courtyard A revealed only four zones with different landscaping considerations. The first section, which comprises most of the North side (shown in green) receives the most direct sunlight throughout the day and over the course of the year. The second section (yellow) receives slightly less sunlight by nature of being at the bottom of the hill on the far East side. Zone three, (in orange) is dominated largely by the pine tree which casts partial shade over most of it in different amounts throughout the year. During the summer months, the hillside to the West often has some direct morning sun and the area adjacent to the central concrete pad receives some direct sunlight in the afternoon. The final section (red) can easily be said to have the poorest prospects



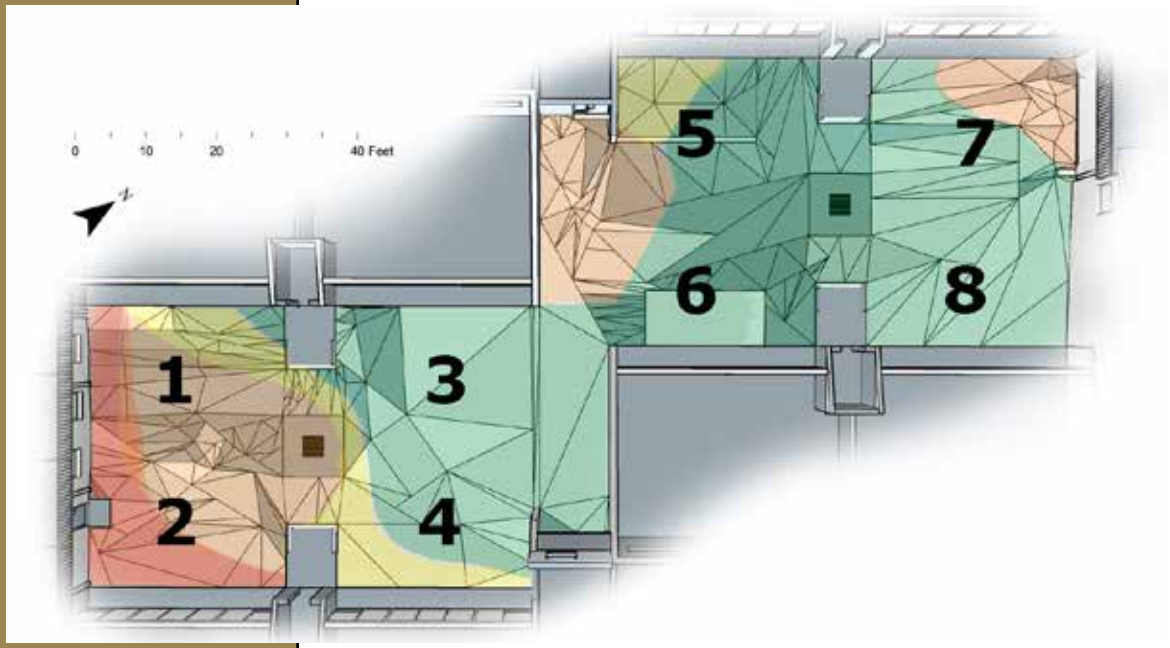
Distinct zones in Courtyard A which determined planting options

Full and Partial Sun in Court A

Sections	Month: Jan	Apr	Jul	Oct
1	5f	7f	7f	6f
2	4f	6f	7f	5f
3	5p	7p	7p	5p
4	n/a	3p	7p	2p

f= hours of full/direct sunlight
p= hours of partial sunlight

for planting. Indeed, site visits have shown that although several planters are found here, even weeds have had a difficult time taking root. This section receives complete shade from the building to the South in winter and partial shade from the Southeast during the day due to being at the bottom of the Court's hillside.



To assess the much larger space in Courtyard D, I divided each half into quadrants and averaged the number of hours of sunlight from several locations in each section. With this data and observations from how the sun moved over the course of the year, I assembled another map to show which areas would work best for planting. Courtyard D at first glance would seem to present a more complicated study area due to its unusual shape. In actuality though, the orientation of its two halves causes them to be lit fairly similarly. As can be seen in the table, quadrants one and five are nearly identical and many of the other quadrants can be seen to have a similar amount of overall sun, once the shade caused by the buildings and trees is accounted for. During the Summer, nearly the entire court gets enough full sun to grow anything, but sections one and two barely receive any direct sunlight at all during Winter.

Quadrants	Month: Jan	Apr	Jul	Oct
1	4p	8p	9p	6p
2	n/a	8p	7p	3p
3	3f/4p	8f	6f/2p	4f/2p
4	5p	8f	9f	2f/3p
5	4p	4f/5p	7f/2p	6p
6	3p	7p	3f/4p	4p
7	4f/2p	4f/3p	3f/4p	4f/3p
8	2f/2p	7f	6f/2p	4f/1p

f= hours of full/direct sunlight
p= hours of partial sunlight

Exploring the Curriculum Content

In the course of visiting the site several times over the Fall semester, I had the additional opportunity to meet with several stakeholders individually and speak with them about their personal hopes for the courts. In one of these meetings, Lisa Allen and I spoke about how specific features in the space could directly connect to the curriculum she teaches. Excited by the way in which this could shape the ultimate development of both courtyards, I asked Erin Parks to help me in emailing a few more teachers to discover what each of the grades study throughout the year.

To the right, you can see the collected data which I received. It confirmed that designing these spaces around the landscaping and natural elements was the correct path to pursue. Classes in both buildings have a strong focus on the natural world in their science lessons, and these outdoor spaces could very easily become a treasure trove of wildlife observations. Some of the curricular pursuits seemed quite simple at first, but ultimately were very difficult to narrow down, while others present truly fascinating opportunities to find community partners who are willing to assist in programming.

Kindergarten

- seasons
- lifecycle of plants
- evaporation

First Grade

- stages of water
- bugs and insects

Third Grade

- rocks, landforms, and soil
- structures of life
- motion and matter
- OK geography
- Famous Oklahomans

Fourth Grade

- Weather
- Electricity
- Animals
- regions of the United States

Development and Implementation of Student Interest Survey

My stakeholder meetings afforded me the opportunity to learn what was important from both the East Elementary administrators as well as teacher representatives from the two buildings. However, I was faced with the prospect that I had not yet heard anything from the largest user group for this project: the Jenks students themselves. Small children are heavily protected in research situations, so the options to seek out their input would be fairly limited. My stakeholders again gave me the solution when they suggested that the teachers might be able to collect the needed perspectives. Every morning, each class discusses a unique daily topic, and I was asked for a short list of questions to have answered.

I prepared three sets of questions to be divided among the different grades to account for the developmental differences as they age. The questions were as follows:

Pre-k and Kindergarten

1) What is your favorite place at school and why?
2) What do you like when going outside with your teacher?
3) When you look out the window, what do you like to see? Do you like seeing birds, butterflies, flowers, clouds?

first and second grade

1) What are your favorite things to see out the window?
2) What do you like about going outside with your teacher?
3) What do you do outside to calm down?

third and fourth grade

1) What do you like about the courtyard?
2) What would you most like to see in the courtyard?
3) What best helps you relax at school?
4) What best helps you focus at school?

After my questions were submitted and reviewed by the administrative team at East Elementary, they were given to the teachers and I eagerly awaited the results. Unfortunately, between these two dates was the December Christmas break, which removed all momentum. When school resumed the results came in and while they would not be considered statistically significant, they were nonetheless helpful.

Of the five responses I received, four were from pre-k and kindergarten classes. These gave me a clearer view of how the youngest users of the space might view it and what they would be looking for. Many of the answers pertained to wildlife and natural elements that allowed for creative, non-restrictive play. The final response was from a class in building D. They were interested in the opportunities to see and interact with animals and were looking for additional seating space. All the responses fit nicely with the other information I had collected, so I began to enter the design stage.

DESIGN PHASES

The design process is always one of iterations and adapting to meet changing concerns. Armed with the results of my research and the four specific requests from my steering committee, I began to prototype interventions for the courtyards. While each and every feature progressed through multiple phases, the guiding principals remained the same throughout.

For Courtyard A, I was very aware of the features which characterized the space and the age groups that I was designing for. The large concrete pad, squat roof lines, and gentle slope give this court a very horizontal appearance. As I considered interventions, I made the conscious decision to continue this trend with just a few vertical elements for more dramatic contrast. The children that spend time in building A are mostly between four and eight years old in Kindergarten to second grade. As such, I was very cognizant that the areas for student use needed to be clearly demarcated and that more thought would need to be put into the classroom flow into and out of the space.

The age range of students in Building D is obviously much different from those in Building A and designing the courtyard required a different approach. These older students are more capable and in fact are encouraged to assist in various tasks around the school such as helping to pick up trash on the playground or keep track of materials for their teachers. With this in mind, I designed Courtyard D with more opportunities for independent exploration and learning as well as for student jobs. The larger space that is conveniently divided into even halves also allowed for more distinct experiences to be created in each half.

Over several meetings on February 24th and March 11th, I was finally able to share my prototypes with my steering committee members as well as Heather Zemanek, Building Principal in A for pre-k and kindergarten students, Jennifer Bradshaw, Building Principal for grades three and four, and Jeffrey Beyer, Head of New Construction for Jenks Public Schools. With the feedback from these meetings as well as from my project reviews, I have updated my designs into their final form. What follows is a deeper dive into the thought process behind each of these suggested interventions and the feedback that guided their evolution, followed by the final designs for each courtyard.

Courtyard A: Prototype Intervention Plan

Common Elements - ADA Compliant Pathways

Proposed pathways linking the interventions for Courtyards A and D

From the outset of this project, one of the primary goals has been to make these courtyards more accessible. The first discussion that I had with the school representatives waded into the issue of doors to the courts being regularly locked. There was also the matter of the elevation changes and how make the spaces compliant with the Americans with Disabilities Act (ADA). Even if it is not necessary for every corner of the courts to be accessible, the central areas and all of the most important interventions should be. I believe the lack of effective paths in the courtyards has been one of the unseen constraints to use, which we are now addressing.

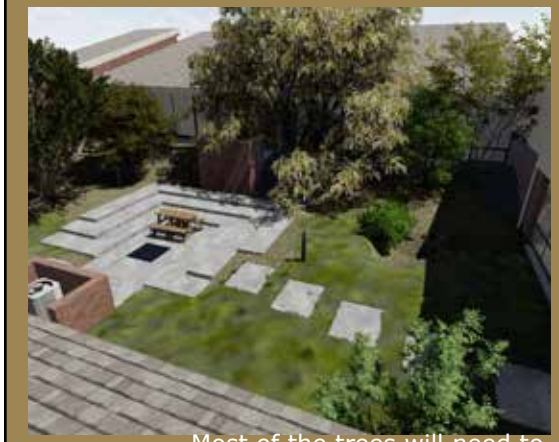
In Courtyard A, there is an almost level pathway of stepping stones which connect the southwest entry to the central concrete area. For multiple mobility reasons (teachers pushing supply carts, wheelchairs or small children not watching the ground), this path will need to be replaced with a smooth, continuous surface. This addition will make most of the usable space in the court accessible and has the added benefit of making the main entrance into the space directly across from a fire escape for emergency reasons.

In Courtyard D, there are really no current paths at all. This allows for the opportunity to determine which entries and potential pathways will best serve the needs of the school. The proposed entry to the north is situated at the greatest elevation change in the court, which would require a considerable ramp to be constructed if chosen. The alternate option was pitched to stakeholders to connect the northwest and southeast doorways as they are both constructed on the same floor level elevation, providing easy access via ADA compliant paths to both the north and south halves of the court. This will also allow for better flow throughout parts of the existing building by allowing passage through the court, and links together multiple emergency exits.

Stakeholder response to these recommendations was very positive. The locations of the paths were well received and it was agreed that implementation should take priority over any other changes. Head of New Construction Jeffrey Beyer was also optimistic that they could perhaps even be completed by the school construction team to expedite the matter.

Common Elements - Trimming Trees and Replacing Grass with New Groundcovers

As previously noted, the stakeholders were unified that the landscaping in the courtyards be as low maintenance as possible due to the difficulties in regularly finding assistance for upkeep. The current landscaping in the spaces consists of grass, which is very rarely trimmed, a number of well established though not all healthy trees, some fairly large sandstone rocks, and a number of planter boxes in each courtyard which are nearly always in the shade. Courtyard A will require considerable tree removal.



Most of the trees will need to be removed in Courtyard A

With the exception of the large pine tree, the existing plants have become overgrown and irregularly shaped through competing for space and light. Removing these trees and planting a single tree on the Northern side of the court will give it more space to grow correctly and develop a canopy that will provide more shade and be more pleasing to the eye than the currently struggling specimens. To manage the erosion in the space, deep rooted grasses can be planted which will not compete

A small grass lawn at the North side of Courtyard D in prototype

with the trees and provide visual interest from the windows. A small selection of larger shrubs were added to the landscape at strategic points to both add sensory experiences for the kids and entice wildlife. The remaining landscape should be covered with low maintenance ground covers and perennials adapted to the local conditions.

Courtyard D will require moderate trimming of the existing pines and the redbud to open up the space beneath the trees. There is a great deal more grass that will need to be supplanted by low maintenance specimens and groundcovers if indeed the school decides to completely do away with the mowable grass in this court. This initial plan used fairly large swaths of low groundcovers with a grass lawn at the northern end of the court which could hold up to more active play.

Stakeholder feedback to these changes was positive and the teachers were excited to have the trees trimmed back. However, without the finalized plans for

the landscaping, there were not significant reactions or contributions made to the idea for new groundcovers.

Courtyard A - Attach Chalkboard to NW Air Conditioner Screen

As previously mentioned, one of the first things that you notice as you enter Courtyard A is the seven foot tall brick screen that hides the air conditioning unit on the Northwest side. As it became apparent quite early on that we would not be able to remove these structures, the most obvious choice was to find a way to work them into the design. The most simple solution was to use this prodigious brick wall in a way that would promote learning in the court. This was proposed by means of turning the obstruction into a chalk board wall for the stepped area that surrounds it. Affixing either slate tiles or a plywood board that has been primed and painted with chalkboard paint, the wall could provide a useful tool for both teaching and for entertaining the young students in building A.

This intervention was well received by the stakeholders and ranked very highly on the list of priorities to implement in Courtyard A. Likewise it was well received at the following review committee meeting, where it was recommended that the same treatment be applied to the southeast brick screen as well, and perhaps even in Courtyard D.

Slate tiles have been mortared to the brick screen for use as a chalkboard

Courtyard A - Large Concrete Water Table with Graded Floor

The possibility of a water feature has been something discussed with stakeholders from the first official meeting. While all members of the steering committee like the idea of a water feature, the upkeep involved has been a deterrent, which has not been overcome. With this consideration, I began to look at what simple and no maintenance water features might look like.

A common tool for allowing young children to play and also explore the world around them are sensory or water tables. Basically a simple box at waist or chest height for small children, the instructor can place a variety of materials with different properties (textures, colors, materials, etc) in the box for the children to explore at their own pace (citation needed). Water can act as an additional medium that the children combine with the other elements.

To tie into the other elements of the space and keep the water table as low maintenance as possible, I suggested it be built of concrete with a graded floor to allow water to run freely to the lower end and out through a built in valve, leading towards the court's central drain. This would allow for a temporary water feature to be established when needed, requiring nothing more than a garden hose. Much larger than most sensory tables, at 8' by 3', it was designed so that a large group of students could gather around it when in use and become a feature for climbing and play when not. The stairs of the concrete pad and terrain on the other side of the table would allow it to be accessible for children of multiple heights and even for the rim to be used for adult sized seating.

The stakeholders and in particular the teachers responded well to the idea of the water table, although some additional context was added. With the current size of classes, it would be difficult for all of the students in a group to crowd around a single table. Multiple tables would allow the teachers to conduct regular classes with fewer students at each station, creating fewer opportunities for conflict. This would also allow for more flexibility in programing each table distinctly if desired.

The need for adult scale seating in the space was also downplayed by stakeholders, although they were highly receptive to the idea for a removeable cover to the water table. This would further expand the options available to teachers in how to use the table. Finally, Head of New Construction Jeff Beyer suggested from his experience that the table could be constructed more easily out of wood by the school district construction team, which would not be as permanent but allow for the space to be refurbished in the future as needed. Based on all this feedback, the decision was made to redesign the water table concept to be more portable and allow more flexibility for whatever specific lessons or layouts the teachers may require.

Courtyard A - Large Concrete Stage Block to add Visual and Creative Interest, Seating

After the addition of the concrete water table to Courtyard A, I began to perceive the direction of the space moving towards that of a sculpture garden. The large, stepped concrete platform at the heart of the court is both striking and confusing in its placement, in that the reasons behind its shape and function are largely unknown and thus open to interpretation. Especially for small children like the ones that will use this space, the idea of a conceptual blank canvas was an appealing one. And by adding the concrete table to one end, the considerable amount of concrete could in its own way be a unifying element to the design.

The obvious next step in this line of thought was to add another feature to the other end of the concrete pad that would visually tie the space together and add creative opportunities not currently present. For this feature, I wanted something that would add some slight verticality to the grouping, while allowing for

safe climbing and play. Ultimately, the form of a large square became the dominant form in my mind, due to the countless ways in which it could be seen in the mind of a child and due to how it quite easily tied into the other features present in the court. The large rectangular pad, the squat air conditioner screens, the boxy stepping stones and even the water table all served to tie this last piece in with the rest. Additionally, the large shape which I began to refer to as the stage block would work as additional seating to the space and as a potential anchor point for a future shade structure.

When presenting this idea to stakeholders, it was a difficult option to sell due to the inherent cost which would be involved to make it a reality. Conceptually, the idea was a popular one, but the head of new construction admitted that the amount of steel and concrete needed to establish a secure footing on the hill would make the stage block extremely difficult to construct and prohibitively expensive for Jenks Schools. In addition to the feedback received for the water

table concept, it became clear that the project should move in other directions and that available funding would best be spent on a permanent shade structure.

Courtyard A - Shade Structure

While a shade structure was recommended in this first iteration, the design was impermanent so as to allow the greatest flexibility within the small space. A simple 10’ by 20’ tent can be seen bridging the space between the water table, chalkboard and stage block. This location creates consistent shade over the stair steps of the concrete pad, where it was assumed most teaching might take place.

The stakeholders liked that this intervention could be easily and quickly carried out, though there were several concerns that with the hectic schedule of a bustling school, the cover might be put up and forgotten, which could degrade it quickly. Ultimately a permanent solution was required.

Courtyard D: Prototype Intervention Plan

Courtyard D - Animal Interaction Elements

In keeping with the themes of engaging nature and giving the older students more focused experiences than the earlier grades, the idea of some form of animal interaction kept arising. The earliest form of the idea sprang from the desire to have some kind of water element in the larger court and involve the students in the upkeep of that while providing a novel way to engage with wildlife that many East Elementary students might not have previously had.

The most simple idea that was a pond with a fish tower, essentially a plexiglass box placed in the water so that fish may swim through it and be viewed from interesting angles. Unfortunately, such a construction would require obvious maintenance throughout the year. Even if the pond water was kept moving to prevent algal growth, additional water would have to be added periodically to resist the constant forces of evaporation and the fish would have to be fed regularly, even during breaks and holidays. Furthermore, even a shallow body of water poses some risk to young children, and so ultimately this idea was considered less feasible than initially hoped.

Another animal element which was proposed early on was a chicken coop. This idea had merit as similar to the fish pond, it could be relegated to part of the courtyard while allowing for other activities elsewhere. Additionally, the idea of a coop was interesting in

A simple lean-to style coop built along the Southern wall of the court

that if built against the Southwest wall, the existing windows could be used to look into both the coop and chicken run. This would allow any students passing through the hall to enjoy them, even if they were not in classes interacting with the animals. From the

Existing hallway windows allow views into a newly constructed chicken coop and run

outside, the small coop and run were fairly simply constructed of wood and chicken wire, with a shingled lean-to roof.

The stakeholders met this suggestion with mixed reactions. There was concern over the amount of waste that might be produced, but it was also revealed that one of the teachers in Building D routinely involves her class in hatching chicken eggs in cooperation with a local chicken farmer. As such, it might be feasible to simply raise the chicks or a separate set of chickens for a small amount of time during which the children could learn about how to care for the animals and maintain their habitat.

Courtyard D - Shaded Teaching Space

A vining plant covered pergola with bench seating for teaching outdoor classes

The extensive amount of unshaded land in Courtyard D has always made it clear that some additional shade structure would need to be constructed. Various options and materials were examined, but in this first iteration the design took a very safe approach with the time tested form of a pergola. By reviewing the data collected from the sun studies of the site, it was determined that an area that was sufficiently close to the proposed ADA compliant pathway and which received little protection from the sun during the hottest months of the year was in the Southern half of the court between the two large pine trees.

In these initial renderings, a simple wooden pergola was added with benches underneath and a climbing plant to provide shade. The pathway descends partially down the slope before curving back to the level pad where the Pergola stands. Stakeholder feedback was positive albeit muted. A number of possible changes would greatly improve the design. The descent to the sitting area would require significant engineering to maintain the ADA compliant 1:20 slope for a pathway, and the space as shown is too small for a traditionally sized class without significant crowding.

Courtyard D - Barrel Composters

The 3rd and 4th graders of Building D have a burgeoning garden club and it was clear from early on that the landscaping of the space might very well present an opportunity to involve them. As Jenks East Elementary is good at involving its students in chores around the school, I liked the idea of enabling the garden club to help in Courtyard D. Adding a composter or two to the space allows the students to simultaneously clean the court of plant debris, learn about the natural processes which break down matter, and create organic compost to use in club activities or fundraisers. This would also create a new avenue for the school to recyle some forms food waste and teach the students about this form of conservation.

There are many kinds of composters, some are as simple as a fenced off area in a corner, whereas some are far more complex with multiple moving pieces. For the courtyard in Building D, I recommended what is often called a barrel or tumbling composter. Turning the compost is far simpler and less messy with this type, making it a more appropiate job for a student. The design also allows for heat to be retained which speeds the decomposition process while attracting fewer bugs. The initial recommendation placed two small composters in Courtyard D under the eaves of one of the classroom modules.

Two tumbling composters in Courtyard D create a learning opportunity from cleaning up

Stakeholders were intrigued by the idea but not yet convinced by the placement. The area suggested for the turning barrels is of course on the oppisite wall of a classroom, and concerns were raised about how much noise might be created in its use. Much of this will depend on how the selected composters are constructed, but an alternate location should still be designated. After the meeting, I also began to look at the proximity of the composters, as they should be positioned as close to the gardening areas as possible for easy use.

Courtyard A - Final Design

Development of Final Design

Taking into account all of the feedback which I received from my stakeholder meetings and institutional reviews, I began to develop the final iterations for each courtyard. In Courtyard A, this involved coming up with new concepts for the smaller sensory tables, developing a concept for a permanent shade structure, finding uses for the many sandstone rocks found throughout the court, and adding a second chalkboard to the Southeast air conditioning screen. Courtyard D would require a reexamination of the covered teaching area and walkways, the addition of positively reviewed elements from Courtyard A's design, and a complete concept for a turtle habitat/naturalized meadow to be built in the Northmost quadrant of the court. Both courtyards would also need to have the landscaping designs finalized, with low water species requiring nominal upkeep.

Courtyard A - Rock Seating Area

In exploring how to use the loose stones found all over Courtyard A in the overall design, One of the most simple solutions was to mortar some together into benches for the space. This new seating area takes advantage of periodic shade from the existing pine tree and simple accessibility from the adjacent ADA compliant path. The picnic table which currently resides in the court has been moved to this area and a simple floor has been constructed using more loose stones which are separated from one another by a lush planting of dwarf mondo grass (Ophiopogon japonicus). This allows for multiple seating options.

Courtyard A - Evolved Sensory Tables with Lids and Trays

In redesigning the large concrete water table into several smaller sensory tables as my stakeholders had requested, it became important to me to create them with the greatest possible versatility in mind. Firstly, a design feature which I believe to be overlooked from the prototype was that it was not nearly as handicapped accessible as it should have been. This current proposal places the tables along the ADA compliant pathway into the court, where they make use of an area which is difficult to plant for due to uneven sun and poor drainage. The tables are placed upon a substrate of decomposed granite,

which will again allow for handicap accessibility but also critical drainage during rain events. The eve of the nearest building also partially hangs over this space so that the tables can be moved against the wall for safety should intense weather be incoming.

In terms of construction, the new sensory tables are made primarily of wood, as was the suggestion of Head of New Construction, Jeffrey Beyer. The interiors are lined with a plastic lining to enable them to be filled with water, and each is equiped with a very small slope and plugged hole at one end should they wish to be used in this way. Again, for this reason it was important that the tables be positioned on a substrate that will allow water absorbtion without becoming muddy. The legs are braced fairly high so that all boxes can be constructed in the same way and simply cut to the needed height. In this view, two are fairly short to accomodate the small students of Building A, while the third is higher for the teacher to use easily and accomodate wheelchair bound and especially tall students.

Teaching outdoors with multiple stations for students

Each sensory table will also be equipped with a simple cover. This will protect projects from the elements and create a flat surface should the lesson require one. Depending on the wishes of the school, one side of these covers could easily be covered with chalkboard paint or a plastic sheet to allow for dry erase marker use.

Finally, the addition of two smaller trays allow for even more versatility for the teachers in Building A. These will create impermanent stations which can be set up in conjunction with the other tables using the rock benches as support. These trays can also be moved far more easily to other areas of the court should teachers wish to hold class in a different location or to socially distance student groups.

Courtyard A - Additional Chalk Boards on SE Screen

Using stakeholder feedback to create a second chalkboard surface on the shorter air conditioning screen was more complicated than simply repeating the process used before. The brick screen on the Southeast side of Courtyard A is too short for a teacher to effectively use as a chalkboard

while standing, and would be difficult to see from sitting on the far end of the concrete pad. Some additional height was required, but building further with bricks was not a particularly pleasing thought. A wooden structure seemed possible, but it would have to be anchored to the brick surface and would need to be fairly robust to perform its purpose and resist warping.

Ultimately, I chose a simple metal frame with angular elements to compliment the space and provide rigidity to the corners. This frame can be easily bolted to the existing brick structure without adding much weight and will add an extra two feet of height to the affixed chalkboard. As an additional feature of the component based design, I was able to add a second chalkboard surface on the side of the brick screen facing the sensory tables. This will allow teachers a convenient writing surface when leading lessons along the path, and adds further visual interest to the metal supports when seen from different angles.

Courtyard A - Gardening Space

While the intentional plan from the beginning has been to design the landscape in Courtyard A to require as little upkeep as possible, I believe that it is still worthy to allow a space where additional gardening can be done if desired. From early on, the site of the previous water feature has seemed a good location for this, as there is already a considerable indentation which will need to be filled and can serve as the basis for this small garden area. This area also receives full sunlight throughout the day, making it a good location for a wide variety of possible plants. The garden has been delinneated by stones excavated from the hillside, and is clearly visible from multiple viewing angles. A water barrel has been installed nearby on one of the primary gutters in the space so that watering if necessary will be a simple task. This space may easily be used to grow a number of plants to attract pollinators, such as fennel, autumn sage, or butterfly weed, or can be allowed to sit dormant in which case the surrounding plants can take over.

A small garden patch raising sunflowers with a tray full of teaching supplies sitting at the ready

Courtyard A - Permanent Shade Structure

The design for a permanent shade structure in Courtyard A went through a great many iterations before a final form was established. There were considerations of permanence, cost, durability and overall fit within the space. Some covers were cheap but would likely not last very long in the Oklahoma sun. Some were very stylized, but not very practical.

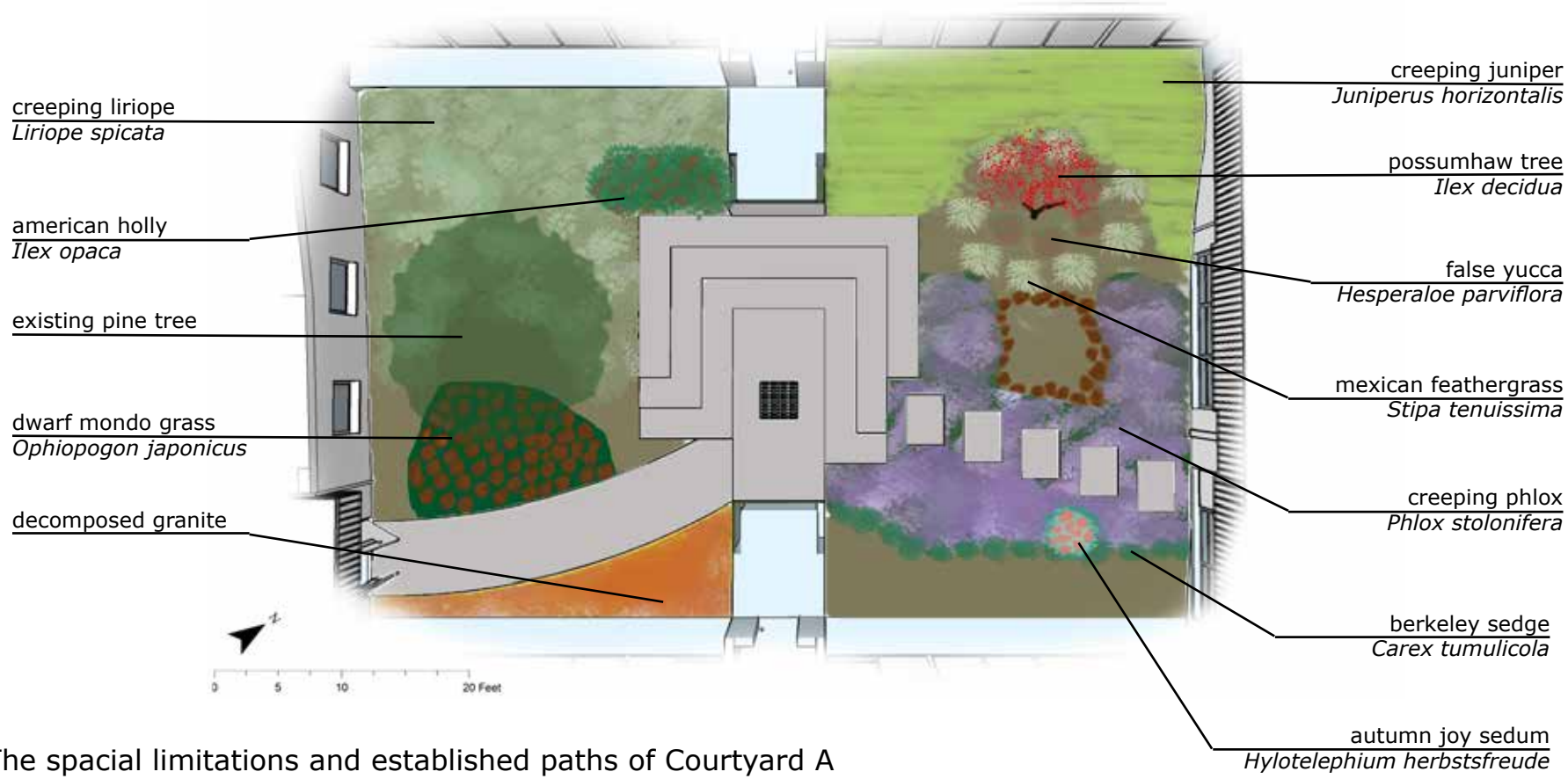
Looking back at some of the effective features from the sculpture garden concept worked as a starting point. The arrangement of the chalkboard, water table and stage block together created an outdoor room which distinguished itself from the rest of the space. The built-in seating was welcoming and the unifying materials tied it all together.

the shade structure provides seating, shade, and tranquility in the space during summer

From here I began to experiment with other shapes and structures which I could design with built-in seating. I liked the shape of a pergola, but wasn't convinced a green roof would be best for this space. The height of the chalkboard wall also made many flat roof structures look unsightly or limited the amount of light inside too much.

This final rendition uses two curved steel beams to frame the space while still giving a very open impression. Seating is built into either side and uses concrete slabs on top to mirror both the concrete pad and the smaller benches along the path. Mortared stone and wood beams also compliment the natural elements in the court while a fabric top allows some light and air to pass through and keep the space from absorbing heat. The low and wide elements of the structure work well in cooperation with the architectural features already in the court to create a feeling of unity.

Courtyard A - Landscaping



The spacial limitations and established paths of Courtyard A helped to inform the landscaping. Considering the main users would be small children, it was important to clearly demarcate the areas most suitable for them for the comfort of their teachers. spreading groundcovers were used amply to fill in areas which need erosion control, and ornamental grasses and sedge have been used to box in the teaching garden, with its soft and resilient mat of phlox. Berry producing shrubs provide food and shelter for birds and many of the groundcovers produce flowers to attract pollinators.

Courtyard D - Final Design

Courtyard D - Sensory Tables and AC Screen Chalkboard

Stakeholder response from my final meeting of the semester was greatly in favor of adding the sensory tables and chalkboard concepts from Courtyard A to the design for Courtyard D if possible. While I was excited to do so, the matter of where to place these elements involved its own set of questions. For the chalkboard, there was the matter of where this element might be the most useful to the teachers in Building D. The northmost set of air conditioner screens would be within the area set aside for the turtle and bird habitat. At first I thought this might be a positive thing as it could be used in signage, but through the steps of putting it all together, it quickly became clear that the location was simply becoming too crowded. Of the two southern screens, I ultimately decided on the screen to the West, as this location was closer to the seating area.

For the sensory tables, the question became where they would be most accessible to the greatest number of students. Similar to Courtyard A, I looked at the ADA compliant pathway and an area where they could be stored if necessary. The concrete pad to the North of the proposed pathway will fit all of these needs and allow the sensory tables to be easily incorporated into lesson plans by teachers using the North seating area, culinary garden or meadow in their lessons.

A chalkboard added to the lower half of D can be used for learning or fun

Sensory tables allow for a range of activities and displays in Court D

Courtyard D - Revised Walkway

Looking back at the the walkway that was designed for Courtyard D, it needed more changes than a simple substitution of materials as in Courtyard A. Whereas the court in Building A could really only practically (much less officially) hold one group at a time, the walkway through the court in Building D might allow it to become a significant route through the building. As such, a simple pathway is not quite suitable, especially in this new age where epidemiology must be considered.

As Mr. Beyer recommended, the pathway has been replaced with concrete and streamlined to remove the difficult to pour curves. The width of the pathway has also been expanded to allow for two classes to pass each other while maintaining a safe six feet between them. Around the established pine, the pathway splits into two separate walkways which are both three feet wide to accomodate ADA specifications.

Expanded pathway through the court allows it to be used as a thoroughfare while safely distancing

A nonverbal communication board assists students with limited vocabulary

Courtyard D - Communication Picture Board

One of the most recent suggestions by stakeholders for an addition to the court in Building D was a pictorial communication board. These boards help children with developmental or communication disorders to express themselves when language acts as a barrier. By presenting them with a limited vocabulary represented by symbols or pictures, children are able to use the board to get their feelings across. This is one form of what has come to be known as AAC, or augmentative and alternative communication (Jonsson et al. 2011).

AAC communication boards are often either handheld or mounted in a place of prominence. To make the board in Courtyard D more functionally useful from a wider variety of locations, it has been effectively divided into sections which are connected to each other and the wall at roughly 45° angles. The options presented

on each section can then be made more context dependent due to the viewing angle. When seen from inside the window by the nearest door, the board might offer suggestions such as look, go, stay, in, out, animal, weather, etc. Conversely, when viewed from another angle inside the space, the board might include medicine, hungry, hot, cold, bathroom, etc. When viewed from the covered teaching space or directly in front, all items are visible at once, giving the student and teacher the full range of options.

Courtyard D - Redesigned Covered Seating Area

In order to improve upon the pergola covering presented in the prototype, the space underneath was considerably expanded. The size of the shade structure was nearly doubled to 12’ x 16’, and use of this space was maximized by installing tiered seating down the side of the slope as opposed to taking a ramp to the front as was previously suggested. In spite of this, handicap accessibility has actually improved due to dedicated seating above the stepped benches with a wide landing to easily navigate with crutches or a wheelchair and quick access to the primary pathway in the space.

It is estimated that the seating area could comfortably sit 10-14 students, although this number could be expanded by seating a row on the pavement to the

An expanded pergola with tiered seating and dedicated handicapped seating near the walkway

buried in the hill near the seating area which can double as seats when necessary. The pergola roof is additionally shaded in the heat of spring and summer by planting climbing plants in the patch of earth behind the handicapped accessible seating area. Looking at lists of common xeriscaped plants which do well in Oklahoma without additional watering, crossvine (Bignonia capreolata) or traditional boston ivy (Parthenocissus tricuspidata) would be good options (OSU Extension 2017).

Establishing a Wildflower Meadow

The three-toed box turtles in Court D have thrived for years with little attention, but it is difficult to guess how they will adapt to losing so much of their habitat. The stress placed upon them can be limited by supplementing the areas set aside for them with additional food sources and temperature regulation tools. Sun boxes made with a clear plastic roof can absorb a great deal of energy, and can be designed to radiate that heat long after the sun has receded. Adding a feeding station and shallow water dish where the turtles can cool directly outside the North door would help to supplement their diet and should also encourage more animal encounters with the students.

A shallow place to cool down and free food bring turtles to view

Proposed wildflower meadow in the North-most quarter of Court D

Turtles usually prefer native grasses and wildflowers, as these more natural habitats attract greater numbers of the insects they partially subsist on (Garrett 2003). As the suggestion for a native plant meadow had been raised before, this was a great opportunity to create a habitat area which might attract a wide variety of additional wildlife to the school. Turtles prefer sloped terrain and Oklahoma wildflowers need a great deal of sun, so the northernmost quadrant of the court proved the most ideal space. Additionally, locating the meadow here will create a dramatic view for those visiting when the wildflowers are in full bloom.

Establishing a thriving wildflower meadow will likely be an interesting experiment for the

teachers and students alike in Building D. Learning which species will thrive in the space and which do not might be a year by year endeavor. Most meadow managers suggest between 50-80 percent of the meadow species should also be native grasses to provide support for the flowers and supply food and shelter for visiting wildlife (Lady Bird Johnson Wildflower Center 2016). These may include some tall grasses like big bluestem and switchgrass as well as shorter grasses like the meadow sedge recommended for the lower court (Garrett 2003). Potential flowering perennials might include purple coneflower, butterfly milkweed, coreopsis, goldenrod, larkspur, indian blanket, or even autumn sage.

As a natural area which might not regularly see foot traffic or maintenance, the meadow would also be a good location for bird houses during the spring months. Feeders and bird baths have been located near the front of the space so that they may be maintained without necessitating having to navigate the tall grass. Once the meadow is properly established after a few years, it may be helpful to remove the existing redbud tree to allow more sunlight where needed.

Courtyard D - Culinary Herb Garden

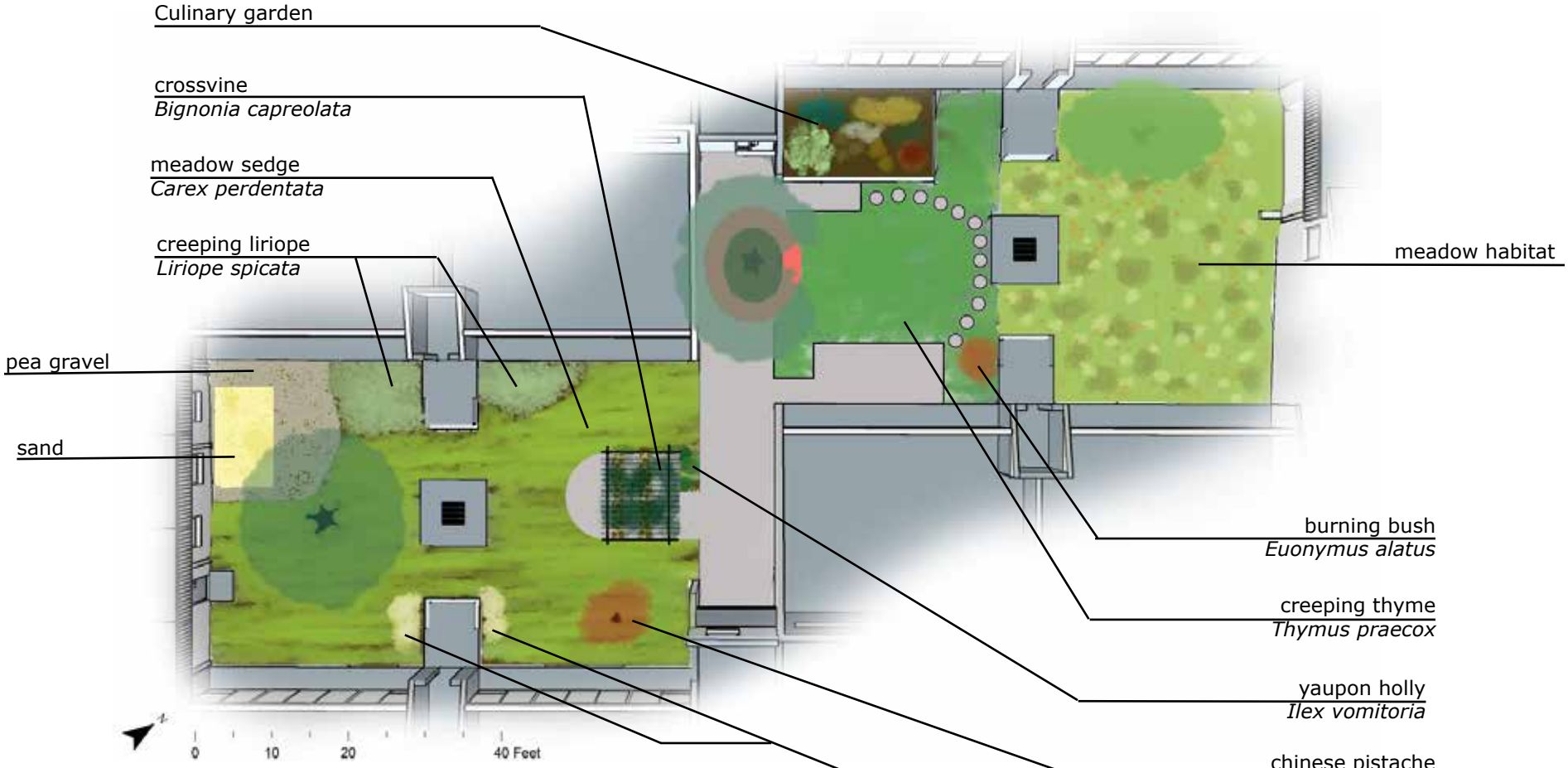
A culinary garden engages people of all ages by involving many of our senses at once. Many are beautiful with seasonal flowers which attract

A culinary garden provides sensory experiences and souveniers to teachers, staff and students

pollinating insects. They often have aromatic and recognizable scents and distinct flavors and some even feel very different to the touch. In fact, studies have shown that these multisensory gardens even have benefits in treating the sensory integration problems present across the autism spectrum (Barakat, Bakr, and El-sayad 2018). Many herbs also do not require a great deal of water or care to succeed in Tulsa's climate, making them a good starter plant for young aspiring gardeners.

The culinary herb garden is positioned near a rain barrel connected to one of the downspouts in the court and the composting barrels have been relocated here as well for convenience. A lush blanket of creeping thyme borders the garden while rosemary, lavender, sage, oregano, parsley, catmint, and other herbs provide learning opportunities and encourage curiousity or calm reflection in students.

Courtyard D - Landscaping



With so much room, there are many opportunities to play with the landscape, but at this stage it seemed appropriate to keep it as simple as possible. The meadow sedge and creeping thyme will serve as low maintenance groundcovers to replace the grass in the court while the new shrubs and grasses will add visual interest. The burning bush is toxic if the leaves or berries are eaten, so if this is a concern, another shrub such as a smoke tree (Cotinus coggygria) might be considered.

CONCLUSIONS AND RECOMMENDATIONS

A great deal has been completed on this project but there remains an equally great amount left to do to make it a reality. Both in terms of construction choices and in programing, there are elements that remain to be resolved and will determine the effectiveness of these interventions and the usefulness of both courtyards moving forward. This section will endeavor to address as many of these questions as have been identified in the completion of this project and provide recommendations for Jenks East Elementary as they pursue the next steps.

Leveraging School Resources

Many of these interventions could potentially be implemented fairly cheaply with the help of community support. While a few expensive components do exist (steel beams and heavy logs for the shade structures), on the whole the designs were made to take advantage of a community that is excited to invest in itself. A small group of determined volunteers could easily make significant headway on many of the suggested interventions over the span of a weekend. Many of the plants used in the landscaping plans are also fairly common in this area and could be donated or purchased through a fundraiser depending on the situation.

Nationally, the pandemic has shuttered many outdoor science education programs at a time when the benefits and safety of outdoor learning are perhaps greater than ever (Sanders 2020). Between the creek at Rentie's Grove and the new outdoor spaces suggested here, Jenks East Elementary could soon be the face of forward thinking education in Oklahoma.

Potential Partners

Even with a plan, completion of the project and subsequent programming will be more successful with the investment of community and national partners. There are many such opportunities available which may help with deployment or upkeep or in returning yearly with programming for the students. As mentioned earlier in this report, some teachers in the school already have friendly associations with farmers, entrepreneurs, or college professors who could introduce a wave of new opportunities for the students.

One such potential partnership is to look into the local weather stations about partnering with the school to sponser a weather station in one of the courtyards. Modern technology allows a full suite of meteorologic equipment to be housed in a very small

package which could easily be mounted somewhere in Courtyard D. Supplemented with a wind sock, rain gauge, etc. checking the numbers on the two systems could easily become an exciting daily event for fourth graders studying weather, and the news channel would certainly benefit from an extra data set and positive press.

National opportunities abound as well. While the current situation across the country is somewhat combative, there will likely soon be many more grants being awarded to schools who are able to demonstrate novel ways of safely educating the youth of our nation. School courtyards can also contribute to a building's score when applying for LEED (Leadership in Energy and Environmental Design)certification, which conveys certain benefits and is often seen as a measure to aim for (Maryland State Department of Education 2012).

And some national departments have state offices as well. The U.S. Fish and Wildlife Service operates a leg of the Partners for Fish and Wildlife (PFW) Program right here in Tulsa. This program has been involved in developing outdoor conservation classroom projects since 1993, and provides technical and financial assistance for schools, landowners, and conservationists across the region ("Ecological Services–Oklahoma Field Office | Southwest Region, U.S. Fish and Wildlife Service" n.d.).

A Word about Phasing

As some of the suggetions for the courtyards might require more of an investment than others, it is appropriate to take a moment to talk about ways in which the interventions might be applied over several phases. As discussed with my stakeholders at our last meeting, both courts would likely benefit most from establishing the ADA compliant walkways, as entry into the spaces is the first barrier to any kind of consistent use. These pathways very much serve as the backbones from which the other interventions can be seen to branch off.

The primary stakeholders representing building A were fairly decisive in their priority interventions. These being the walkway, the initially proposed chalkboard, and the sensory table. With the Head of New Construction's blessing, these should be fairly simple to procure as most pieces can be assembled by Jenks Public Schools. As a primary investment, a very good place to start. After this, most of the landscaping would benefit from being carried out simultaneously. Once the unfortunate trees have been removed, adding the groundcovers to prevent further erosion needs to be done fairly quickly. Constructing the benches and rock seating area would be a fairly cost effective change at this time as well. A temporary shade structure as the one mentioned in the prototyping stage would be a low cost and useful tool in gauging the desire for a full fledged cover.

The size of Courtyard D makes prioritizing where to invest all the more important. Once the walkway has been constructed (a much more significant undertaking, unfortunately), the most simple intervention involves trimming the low branches on the trees to make better use of the benches already stationed in the space. Sensory tables can also be easily added into the court as shown in the previous pages, which will give the space most of the necessary elements to carry out a class in the courtyard.

Landscaping the Northern half the Court makes sense at this point, as new lesson functionality would be added with the additions of the meadow habitat and the culinary garden. At this point, I would recommend the construction of the covered teaching space and AAC board. While it would certainly add value to the court and the school in the midst of a pandemic, it was not prioritized higher because it does not add new teaching opportunities so much as transplant them outdoors. Finally, The chicken coop and any additional paths or landscaping for the southern half of the court should be completed at this point. This will allow the teachers to assess what will potentially make the most difference in the lives of their students and the school to make important partnerships in funding and programming both courtyards.

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Covid-19

At the time of this writing, Tulsa, Oklahoma, as well as our state, our nation, and indeed the rest of the world are struggling to understand not only how to effectively combat a virulent pandemic, but also what may come after. Each of us has a story to tell about how we have been personally affected and I am no different in that regard. The final few months of this project were wildly different than what I had expected, with dramatic changes to my work, school, and private life. Stakeholder meetings were all but out of the question, and even the impetus to create something lasting where students and teachers can congregate may seem somewhat quaint in retrospect. I hope not. As we pick up the pieces and look towards a world with cough guards on desks and intermittent class time, I find myself believing more than ever that the natural world has things to teach us, and that in outdoor spaces like these, we might train a new generation that truly appreciates the opportunity to come together and learn in ways we have not dreamed of.

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