2017 LAF CSI PROGRAM LANDSCAPE PERFORMANCE SERIES: Harvest Master Planned Community

Research Title: Landscape Performance Series – The University of Texas at Arlington Case Study Investigations 2017: Harvest Community, Argyle; Shops at Park Lane, Dallas; and Wayne Ferguson Plaza, Lewisville[1]

Research Fellows:
Taner R. Ozdil, Ph.D., ASLA,
Associate Professor of Landscape Architecture, &
Associate Director for Research for the Center for Metropolitan Density

Research Assistants:
Ravija Munshi, MLA Program
Riza Pradhan, MLA Candidate
Ali Khoshkar, MLA Program
Landscape Architecture Program, CAPPA, The University of Texas at Arlington

Case Study Partners:
Project Firm: TBG Partners, Project Contact: Jonathan Dunbar, Gabriela Weber, Jim Manskey
Sponsor/Research Partner: Landscape Architecture Foundation (LAF)

Acknowledgement:
Many Thanks to the Harvest Community, TBG Partners, Hillwood Development Company, LLC

(Source: TBG Partners, 2017)

[1] This white paper can be cited as: Ozdil, T., & Munshi, R., & Pradhan, R., D., & Khoshkar, A.(2017). *2017 LAF's CSI Program Landscape Performance Series: Harvest Community, Argyle Methodology*. The University of Texas at Arlington. Arlington, Texas. https://doi.org/10.31353/cs1261

Overview of UT Arlington's Research Strategy for Case Studies

Introduction:

The purpose of this research is to investigate the landscape performance of three different North Texas landscape architectural projects: 1) Harvest Master Planned Community, Argyle, 2) Shops at Park Lane, Dallas 3) Wayne Ferguson Plaza, Lewisville Texas. This research is initiated as part of 2017 Case Study Investigation (CSI) program funded by the Landscape Architecture Foundation (LAF). It is conducted in collaboration with the project landscape architecture firms: 1) & 2) TBG Partners 3) Design Workshop.

The case study research tasks and reporting are outlined in advance by LAF to present a project profile and overview, sustainable features, challenges/solutions, lessons learned, role of landscape architects, cost comparisons, and performance benefits. Within the LAF framework, the UT Arlington research team, with its professional firm partners, collected, reviewed, and analyzed/synthesized project-related data for over 23 weeks between February – August, 2017 to prepare the case studies published online at the LAF website.

The UT Arlington team developed its overall research design strategy in the 2013 & 2014 cycles as one of the recipients of the LAF's CSI grant/recognition (see Ozdil et. al., 2014). As a third term grant recipient in 2017, the UT Arlington team continues to follow the strategy developed in the previous years with some revisions based on the lessons learned in the 2013 and 2014 period. The research outlines its inquiry under the three sub-category headings – environmental, economic, and social (including cultural and aesthetic) – to establish a comprehensive and systematic framework, ease the data collection and analysis process for multiple case studies, and to avoid losing sight of research goals while documenting a diverse set of findings. These subcategories are used primarily to identify and organize the performance benefits of landscape architecture projects in this collaborative effort.

The UT Arlington research combines quantitative and qualitative methods to document both landscape architectural projects and to assess their performance benefits (Deming et. al., 2011; Murphy, 2005; Moughtin, 1999; Ozdil et. al., 2015 & 2014; Ozdil, 2016 & 2008). Methodological underpinnings of the research for the case studies are primarily derived from a systematic review of performance criteria and variables from: (1) the LAF's landscape performance series *Case Study Briefs* (LAF, 2017), (2) the case study methods that are developed for designers and planners in related literature (Francis, 1999; Gehl & Svarre, 2013; Gehl, 1988; Marcus et. al. 1998; Ozdil et. al., 2014 & 2013; Preiser et. al., 1988), (3) the primary data collection methods through surveys (Dilman, 1978), site observations, behavior mapping, and assessment techniques (Gehl & Svarre, 2013; Marcus et. al. 1998; Whyte, 1980 & 1990), and finally (4) project-related secondary data collected from project firms, project stakeholders, public resources and databases. The data gathered from all the research instruments are further analyzed, synthesized and summarized as the performance benefits for the three case studies under investigation. The findings are organized within the LAF framework, as it is outlined earlier in this document for online publication. The research is designed to highlight the value and significance of these three landscape architecture projects by utilizing objective measures and by documenting and evaluating their performance to inform the design of future urban landscapes.

Data Collection Methods:

The research plan involves collection of primary and secondary data through online surveys, systematic review of available secondary data and some site observations to document environmental, social and economic performance benefits. As a first step, the research team plans to acquire necessary permissions from the Institutional Review Board at UT Arlington prior to primary data collection involving human subjects. The following section briefly reviews some of the major data collection strategies adopted in this research.

Survey: A survey instrument is being developed by the research team to collect primarily social performance data for all three sites. The survey measures users' perception on topics such as: quality of life; sense of identity; health, community, and educational benefits; safety and security; presence of arts; availability of informal and organized events as well as some other key variables listed below. The survey is informed by relevant literature, by other survey instruments prepared for parks and other landscape architecture projects, and by research teams' previous work in grant 2013 and 2014 grant cycles. The survey instrument and the variables questioned within are kept similar in all three cases in order to develop a more homogenous measure with which to study varying sites. The survey simply asks the users (residents, visitors, employees, etc.) of the sites for their perceptions and experiences of the case study landscapes. The survey will be composed of three parts. The first part of the questionnaire documents user profiles as well as user perceptions and choices of activities available on the site by using multiple choice questions. The second part of the survey asks users to rate performance-related statements with Likert scale questions. The final portion of the survey asks for additional comments of respondents who want to share additional information with the research team. The survey is voluntary and the respondents were assured that identities would be kept confidential to ease privacy concerns. The survey is kept short (15 minutes to complete) and is being prepared for web/online platforms.

Archival and Secondary Data: This research benefits heavily from archival and secondary data obtained from project firms, project stakeholders, public resources, and private databases to measure social, economic, and environmental performance benefits. In accordance with LAF's mission, this research was a product of a partnership among the academic research team, project firm, and LAF. Where and when data were available from the secondary sources, such as the landscape architecture firm, client(s), project partners, scholarly literature, and publicly available sources, the project team systematically plans to collect and organize the data, review its content, and assess its rigor and integrity.

Site Observations: Passive observation, photography, video recording, and site inventory and analysis techniques may also be utilized in 2017 case studies to capture social performance benefits. Observational methods utilized in this research will not involve any intrusive interaction with the subjects. Although photography or video recording is used, the identity of the subjects is blurred unless they allow researchers to use their images or the research partners provided photos with credentials. In all case studies, the research team plans to inform the stakeholders prior to site visits and acquire necessary permissions.

Research Design:

The UT Arlington team designed its research strategy under three focused thematic areas – environmental, economic, and social (including cultural and aesthetic) – for all three case studies. The strategy for all three cases this year uses variables and measures informed by relevant scientific literature, UTA's previous strategy proven to be effective in 2013 & 2014 grant cycles, and most importantly the new project typologies (Master Planned Community, Traditional Town Plaza, and Contemporary TOD Plaza with Shops) assigned in the 2017 cycle. In the beginning of the investigation, the research team benefited from this strategy for conducting a systematic research that produces replicable performance criteria and methods for all sites. After the measurable criteria were identified and the possibilities exhausted, the UT Arlington team further refined its approach by customizing performance criteria and procedures to each case study site to better document and report the varied qualities of each site independently. While achieving a comparable set of performance benefits for all sites was the goal, and this strategy produces the greater framework for the research, customizing

detailed performance criteria later in the process helped the research team to overcome concerns about data availability, varying project typologies, project goals and outcomes. Given the strong variation in project typologies in 2017, a separate research instrument (survey) is being created for each site.

The findings of the investigations in all cases focused first on performance benefits related to the site itself, then its immediate adjacencies, and finally on the project block group/neighborhood/district or zip code. For example, performance benefits that are most direct and telling about the project site itself are emphasized more in comparison to indirect performance benefits and findings about the project adjacencies or neighborhoods. This strategy is also used in reporting the findings to clarify the document and to ease the review.

In conclusion, the data collected through these strategies were systematically reviewed and appropriate methods for analysis of specific performance criteria are highlighted in the detailed methodology below. The following section presents research design specifics for the Harvest community, a basic summary of the performance criteria under investigation, and the data sources and procedures involved in measuring that particular performance criteria.

Overview of Harvest Master Planned Community, & UT Arlington's Research Strategy:

Figure.1 Harvest Community, Argyle, Texas (Source: Hillwood Communities)

Overview:

Envisioned to celebrate the rural roots of the North Texas region, Harvest resides in a rapidly urbanizing corridor along an interstate highway north of downtown Fort Worth. Harvest is an 1,150-acre (290 acres built with 600 occupied plots) master planned agrarian residential community with an overall vision and landscape character based on producing and maintaining crops and farmland in a suburban context.

Comprised of five distinct areas, The Lake, The Village, The Farm, The Park, and The North Village, the project seeks to protect and enhance the site's rural character while incorporating the developer's five "Live Smart" principles: Environmental Stewardship; Healthy Living; Education and Enrichment; Integrated Innovative Technology; and Sense of Community. The plan emphasizes a traditional community planning grid, a central 1.5-mile green pedestrian network for walkability, and enhanced amenities that support rural character including an 11-acre lake, 5-acre farm and community center.

Case Study Strategy: The research team followed the comprehensive investigation strategies outlined earlier in this document by concentrating on the social, environmental, and economic implications of the project. The team's approach to identify performance benefits for the Harvest community is mainly driven by detecting the community level challenges (see above), by reviewing its spatial organization to

create people places, and by evaluating elements influencing its forms and functions to provide residents with access to outdoor amenities that open opportunities to experience agriculture, recreation and education. As a master planned agrarian community, envisioned to celebrate the rural roots of the North Texas region, encouraged the research team to investigate resident perceptions. After reviewing the relevant literature, the project information, and the firm archives with TBG Partners, the UT Arlington research team developed detailed procedures and performance measures that can be tied to the project's initial challenges, goals and objectives (see figure.2 for research design).

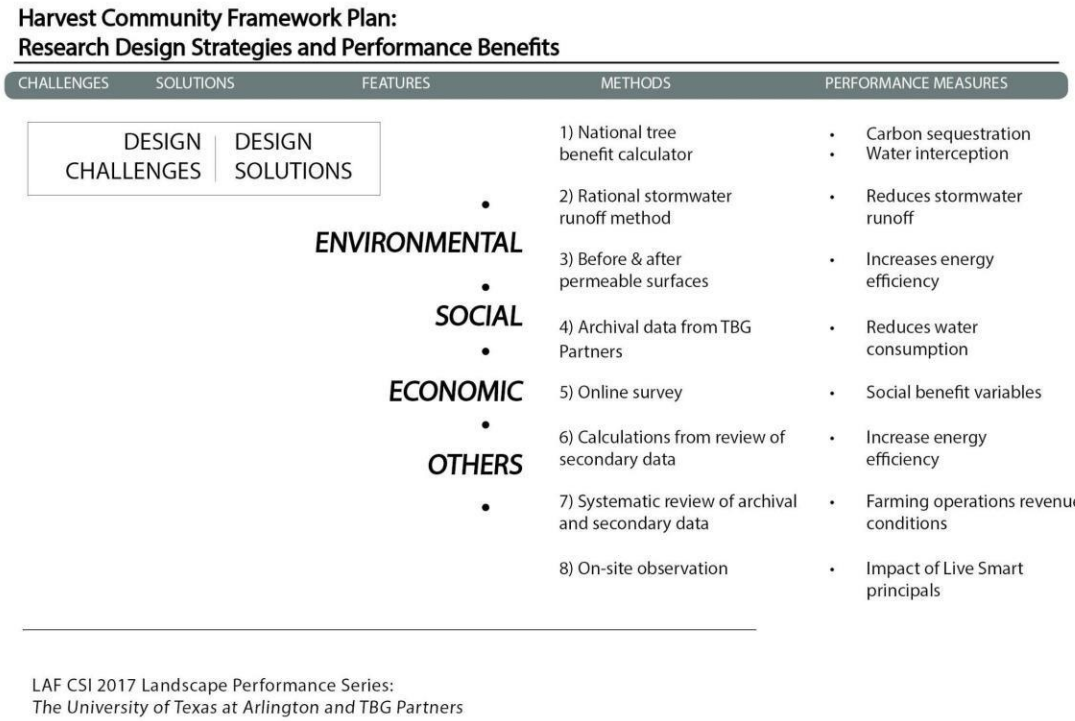

Figure.2 Research Design

The research team followed the research design strategies outlined in the earlier portion of this document for the Harvest Community case study (see figure.2 above). The team explored all social, economic and environmental performance measures. Given the community-level focus on agriculture and smarter living, the research team emphasized performance criteria that are more telling about the perceptions of the users, programmatic elements of the various components of the community, innovative construction practices, and cultural implications for residents, as well as its economic impact to its immediate context. The community's diverse age groups of the homeowner base encouraged the research team to emphasize online surveys and some site observations as effective data collection strategies. After acquiring Institutional Review Board (IRB) permissions for human subjects from UT Arlington, the survey was distributed via e-mails, social media outlets, and/or professional network.

The research procedure also involved documenting the environmental and economic performance indicators for this case study. Various secondary data sources were reviewed to determine the project's environmental and economic influence, and numerous positive indicators were found representing the larger context of the project site. However, especially in the case of economics, the majority of the financial data came from the client and the secondary data was attainable only for the greater city, providing a limited view of the economic benefits. Therefore only a few selected economic performance measures are highlighted for the Harvest Community case study. The next section outlines the specific

performance benefits documented for this 1,150-acre (290 acres concentrated) community by illustrating data sources and procedures followed, as well as the limitations encountered measuring the particular performance criteria.

Performance Indicators:

The following bullet points explain and illustrate some of the more complex performance indicators summarized on the LAF CSI website. The performance indicators listed below are in their full form, and explained in detail to inform the reader about the calculations, procedures, limitations and/or significance of the research. These bullets are later formatted, summarized and/or further revised to comply with the online portal restrictions.

Environmental Performance Benefits:

Performance Indicator.1:

- ***Sequesters 95,050 lbs of atmospheric annually through 1,998 newly-planted trees. The trees canopies also intercept 426,700 gallons of stormwater runoff annually.***

Scientific name	DBH (inches)	CO2 sequestered by one tree (lbs)	Quantity of trees	Total CO2 sequestered (lbs)
FRAXINUS PENNSYLVANICA 'URBANITE'	3	40	127	5080
PISTACIA CHINENSIS	3	57	122	6954
QUERCUS MUEHLENBERGII	4	89	193	17177
QUERCUS VIRGINIANA	4	61	69	4209
TAXODIUM DISTICHUM	3	40	45	1800
ULMUS CRASSIFOLIA	3	40	93	3720
ULMUS PARVIFOLIA 'EMER II'	3	57	371	21147
VITEX AGNUS-CASTUS	3	39	108	4212
VITEX AGNUS-CASTUS	3	39	114	4446
QUERCUS VIRGINIANA	4	61	6	366
JUNIPERUS VIRGINIANA	4	24	282	6768
ULMUS CRASSIFOLIA	3	40	49	1960
FRAXINUS TEXENSIS	4	59	5	295
QUERCUS SHUMARDII	4	59	108	6372
ILEX DECIDUA	3	21	12	252
ILEX VOMITORIA	3	21	22	462

LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	15	21	315
QUERCUS VIRGINIANA	4	61	21	1281
PROSOPIS GLANDULOSA	3	40	45	1800
TAXODIUM ASCENDENS	3	40	16	640
CERCIS CANADENSIS	3	39	20	780
LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	15	15	225
LAGERSTROEMIA INDICA WHITE FLOWERING VARIETY	3	15	2	30
CARYA ILLINOINENSIS	4	59	26	1534
PYRUS COMMUNIS	3	57	46	2622
PRUNUS DOMESTICA 'OPAL'	2	10	60	600
Total			**1998**	**95050**

Table.1: Tree potential for carbon sequestration.
Source: http://www.treebenefits.com/calculator/, 2017

Methods: As illustrated in the table above, the carbon sequestered is calculated with the National Tree Benefit Calculator.
For example: A single *Pistacia chinensis* of 3" DBH sequesters 57 lbs of CO2. There are total of 122 *Pistacia chinensis* in the planting plan of the Harvest Community. Thus, the total amount of CO2 sequestered by 122 *Pistacia chinensis* would be:

57 lbs.*122 = 6,954 lbs.

Limitations: This indicator relies on tools and estimations that are developed/provided by third parties and may be subject to errors beyond the research team's control. For example, since the Harvest Community is not totally completed, the plants are still not fully mature. The DBH for the plants is considered as 2", 3", and 4" as per the information sourced from TBG Partners.

Scientific name	DBH (inches)	Stormwater intercepted by one tree (gallons)	Quantity of trees	Total stormwater runoff intercepted (gallons)
FRAXINUS PENNSYLVANICA 'URBANITE'	3	148	127	18796
PISTACIA CHINENSIS	3	272	122	33184
QUERCUS MUEHLENBERGII	4	402	193	77586
QUERCUS VIRGINIANA	4	195	69	13455

TAXODIUM DISTICHUM	3	148	45	6660
ULMUS CRASSIFOLIA	3	148	93	13764
ULMUS PARVIFOLIA 'EMER II'	3	272	371	100912
VITEX AGNUS-CASTUS	3	179	108	19332
VITEX AGNUS-CASTUS	3	179	114	20406
QUERCUS VIRGINIANA	4	195	6	1170
JUNIPERUS VIRGINIANA	4	156	282	43992
ULMUS CRASSIFOLIA	3	148	49	7252
FRAXINUS TEXENSIS	4	211	5	1055
QUERCUS SHUMARDII	4	211	108	22788
ILEX DECIDUA	3	80	12	960
ILEX VOMITORIA	3	80	22	1760
LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	99	21	2079
QUERCUS VIRGINIANA	4	195	21	4095
PROSOPIS GLANDULOSA	3	148	45	6660
TAXODIUM ASCENDENS	3	148	16	2368
CERCIS CANADENSIS	3	179	20	3580
LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	99	15	1485
LAGERSTROEMIA INDICA WHITE FLOWERING VARIETY	3	99	2	198
CARYA ILLINOINENSIS	4	211	26	5486
PYRUS COMMUNIS	3	272	46	12512
PRUNUS DOMESTICA 'OPAL'	2	86	60	5160
Total			**1998**	**426700**

Table.3: Trees' potential for water interception.
Source: http://www.treebenefits.com/calculator/, 2017

Methods: As illustrated in the table above, the storm water intercepted is calculated with the National Tree Benefit Calculator.
For example: A single *Pistacia chinensis* of 3" DBH intercepts 272 gallons of stormwater runoff. There are total of 122 *Pistacia chinensis* in the planting plan of the Harvest Community. Thus, the total amount of stormwater intercepted by 122 *Pistacia chinensis* would be: ***272 gallons*122 = 33,184 gallons***

Limitations: This indicator relies on tools and estimations that are developed/provided by third parties and may be subject to errors beyond the research team's control. For example, since the Harvest Community is not totally completed, the plants are still not fully mature. The DBH for the plants is considered as 2", 3", and 4" as per the information sourced from TBG Partners. Given that the data was collected from the National Tree Benefit Calculator there may be inherent errors and/or omissions as the

assumptions in this calculator have not been updated since 2008.

Performance Indicator.2:

- ***Captures and slow-releases 100% of stormwater runoff for a 100-year storm event through the main detention pond. The man-made lake (detention pond) manages 5,226.9 cfs of runoff from the 320-acre development for a 100-year storm event .***

Table.1: Harvest detention pond's location.

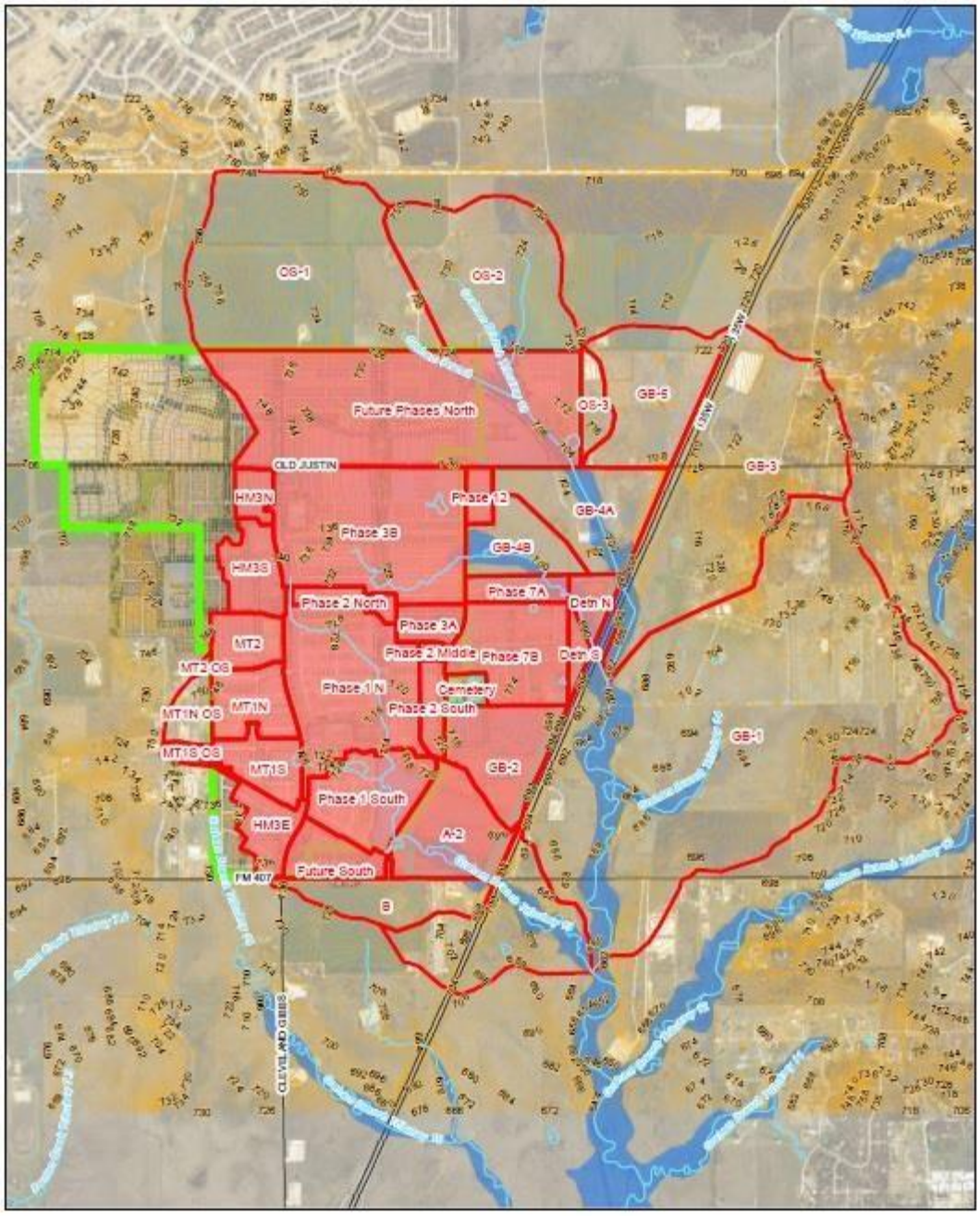

Table.2: Harvest future drainage area map.
Source: Civil engineer, Jones | Carter

Table 17
Harvest - Graham Branch Tributary 13
Detention Results - 100-Year Event

December 2016

Model (Development Phase)	Detention Basin	Control Structure	Inflow (cfs)	Outflow (cfs)	Peak Storage (ac-ft)	Peak WSE (ft)
Harvest Retail Phase	Phase 1 Detention	See Reference (1)	1,521.5	1,056.9	41.0	708.1
Harvest Retail Phase	Detn MT2	1-24" RCP; 1-42" RCP	398.9	84.4	22.0	728.4
HM3	Phase 1 Detention	See Reference (1)	1,503.7	1,025.2	40.3	708.0
HM3	Detn MT2	1-24" RCP; 1-42" RCP	401.6	84.5	22.1	728.4
HM3	Detn HM3S	1-24" RCP; 1-36" RCP	191.7	83.8	4.4	730.3
Future Phase-Full Dev	Phase 1 Detention	See Reference (1)	1,495.6	1,024.6	40.3	708.0
Future Phase-Full Dev	Detn MT2	1-24" RCP; 1-42" RCP	401.6	84.5	22.1	728.4
Future Phase-Full Dev	Detn HM3S	1-24" RCP; 1-36" RCP	191.7	83.8	4.4	730.3
36" Conn Clogged	Phase 1 Detention	See Reference (1)	1,497.0	1,027.0	40.3	708.1
36" Conn Clogged	Detn MT2	1-24" RCP; 1-42" RCP	401.6	84.5	22.1	728.4
36" Conn Clogged	Detn HM3S	1-24" RCP; 1-36" RCP	191.7	87.9	4.3	730.7
HM3S Outfall Clogged	Phase 1 Detention	See Reference (1)	1,571.0	1,093.2	41.8	708.2
HM3S Outfall Clogged	Detn MT2	1-24" RCP; 1-42" RCP	401.6	84.5	22.1	728.4
HM3S Outfall Clogged	Detn HM3S	Overflow Weir	191.7	180.8	7.2	732.9

Table.3: Harvest detention basin results.
Source: Civil engineer, Jones | Carter

As illustrated from the table and future drainage map above, Pond 1 directly serves the following drainage areas within Harvest:

- o Phase 1 N
- o Phase 1 South
- o Future South
- o HM3E
- o MT1S
- o It also receives outflow from Meadows Pond 1 and Meadows 3 Pond A

As calculated outflow from the all the phases derived from table above, total outflow of 5,226.9 cfs drains to the Phase 1 Lake.

Methods: Data (Construction Documents for stormwater/drainage plans and calculation) obtained from the civil engineer Jones | Carter and further calculations were made by the project team. All stormwater is directed to on-site swales, dry wells and/or infiltration basins in the open space systems to cleanse and infiltrate the water. The storage capacity of these combined systems is greater than the volume generated in post-construction up to and including the 100-year storm event.
Reference: Daybreak Community.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researcher's control.

Performance Indicator.3:

- ***Anticipated to conserve approximately 23,714 kWh of electricity through the cooling effects of newly-planted trees.***

Scientific name	DBH (inches)	Energy conserved by one tree (kwh)	Quantity of trees	Total energy conserved (kwh)
FRAXINUS PENNSYLVANICA 'URBANITE'	3	8	127	1016
PISTACIA CHINENSIS	3	15	122	1830
QUERCUS MUEHLENBERGII	4	23	193	4439
QUERCUS VIRGINIANA	4	11	69	759
TAXODIUM DISTICHUM	3	8	45	360
ULMUS CRASSIFOLIA	3	8	93	744
ULMUS PARVIFOLIA 'EMER II'	3	15	371	5565
VITEX AGNUS-CASTUS	3	11	108	1188
VITEX AGNUS-CASTUS	3	11	114	1254
QUERCUS VIRGINIANA	4	11	6	66
JUNIPERUS VIRGINIANA	4	7	282	1974
ULMUS CRASSIFOLIA	3	8	49	392
FRAXINUS TEXENSIS	4	12	5	60
QUERCUS SHUMARDII	4	12	108	1296
ILEX DECIDUA	3	6	12	72
ILEX VOMITORIA	3	6	22	132
LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	7	21	147
QUERCUS VIRGINIANA	4	11	21	231
PROSOPIS GLANDULOSA	3	8	45	360
TAXODIUM ASCENDENS	3	8	16	128
CERCIS CANADENSIS	3	11	20	220
LAGERSTROEMIA INDICA X FAURIEI 'NATCHEZ'	3	7	15	105
LAGERSTROEMIA INDICA WHITE FLOWERING VARIETY	3	7	2	14
CARYA ILLINOINENSIS	4	12	26	312
PYRUS COMMUNIS	3	15	46	690
PRUNUS DOMESTICA 'OPAL'	2	6	60	360
Total			**1998**	**23714**

Table.1: Tree's potential for energy conservation.
Source: http://www.treebenefits.com/calculator/, 2017

Methods: As illustrated in the table above the energy conserved is calculated with the National Tree Benefit Calculator.
§ For example: A single *Pistacia chinensis* of 3" DBH conserves 15 kWh of electricity for cooling and reduces consumption of oil or natural gas. There are total of 122 *Pistacia chinensis* in the planting plan of the Harvest Community. Thus, the total amount of energy conserved by 122 *Pistacia chinensis* would be:

15 kWh.*122 = 1830 kWh.

Limitations: This indicator relies on tools and estimations that are developed/provided by third parties and may subject to errors beyond the research team's control. For example, since the Harvest Community is not totally completed, the plants are still not fully mature. Some of the planting may exist further in distance than where the structural components of the community exist. It can still be argued that such planting scheme have impact on the microclimate of the community at large. On another note, the DBH for the plants is considered as 2", 3", and 4" as per the information sourced from TBG Partners. Given that the data was collected from the National Tree Benefit Calculator, there may be inherent errors and/or omissions as the assumptions in this calculator have not been updated since 2008.

Performance Indicator.4:

- ***35% of the site is dedicated to landscape amenities, agricultural land and open space (LEED qualified), as compared to a conventional master planned community (20-25%).***

Source: Town of Argyle, site landscaping requirements, http://www.argyletx.com/161/Planning-Zoning
LEED credit, https://www.usgbc.org/credits/core-shell/v20/ssc52

Method: Given data is obtained from the client, Hillwood Communities.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researchers' control.

Performance Indicator.5:

- ***Increases energy efficiency for 31% of the residential lots via solar orientation via east/west street alignment through planning and design.***

Method: Lots calculation is done from the maps provided by the design firm TBG Partners and based on the sun path diagram. Harvest community has total **3,272** lots and **1,030** have a north/south alignment.

Limitations: Given that the data was collected from secondary sources, there may be inherent errors and/or omissions to such data beyond the researcher's control.

Social Performance Benefits:

Performance Indicator.1:

According to the Harvest Community Survey conducted by the UT Arlington research team, respondents ***agree or strongly agree with the statement*** *that Community Landscapes (N:* ***68****):*

- Promotes **scheduled/organized events** for **98.5%** of the survey respondents. They identified primarily through ***Community Organized Gatherings/Events, Farmers Market, and Festivals.***
- Creates a **sense of identity** for **92.7%** of the survey respondents.
- Promotes the concept of **pedestrian-friendly connected communities** for **89.7%** of the survey respondents.
- Increases **participation in outdoor events** for **83.9%** of the survey respondents.
- Promote **urban agriculture** for **82.4%** of the survey respondents.
- Provides **rural landscape character** for the community for **82.3%** of the survey respondents.
- Promotes **healthy living** for **79.4%** of the survey respondents. They identified primarily through ***Passive Activities, Relaxing, and Vigorous Walk***.
- Improves the **quality of life** for **79.4%** of the survey respondents. They identified primarily through ***Encourage Sense of Community, Increase Physical Activity, Reduce Mental Stress, and Improve perception of the Area.***
- Promotes **educational activities** for **77.9%** of the survey respondents. They identified primarily through ***Farming, Children and Adult Education, and Outdoor Classes.***
- Promotes a better understanding of **sustainability** for **75%** of the survey respondents. They identified primarily through ***Native Planting, Walkability, Farm-to-Table, and Drought-Responsive Landscape*****.**
- Promotes a **safe & secure** environment for **75%** of the survey respondents. They identified primarily through ***Lighting, Visibility, Presence of Others, and Planting Scheme.***
- Accessible for all (**American Disability Act-ADA**) for **72.1%** of the survey respondents.
- Improves understanding of **landscape architectural practice** for **61.8%** of the survey respondents.
- Promotes **art and artistic activities** for **47%** (39.7% neutral) of the survey respondents. They identified primarily through ***Garden Design, Arts and Crafts, and Painting***.
- Increase **the scope of donations from partners/fundraisers/homeowners** for **41.2%** (45.6% neutral) of the survey respondents.
- Encourages **participation in Bike Share program 32.4%** (47.1% neutral) of the survey respondents.

Survey notes: 67 Harvest Community residents were surveyed between June and early July 2017 by the UT Arlington research team. **92.6%** of the community users surveyed noted themselves as '**resident'** while **2.9%** as '**visitor' and 2.9% as 'employee.' 55.9%** of the respondents were noted as **Married with Kids, and 32.4%** of respondents were **35-45** years old (highest categories). Survey findings also illustrated that only **1.5%** of the users were visiting the community landscape amenities for the **first time, 26.5%** visited **daily** while **97%** visits the community landscapes at least **one time per month**. Additionally, **58.8%** of the respondents traveled within the community **on foot** while **36.8%** travel by using a **personal vehicle. 44.1%** of the respondents indicated that the **Pocket Park(s) is the closest landscape amenity** to them while **33.8%** indicated the **Central Park as the closest landscape amenity.**

Method: Please see the data collection methods at the beginning of the paper.
Limitations: This survey is conducted only on an online platform due to resource, time, and permissions limitations. The online survey recruitment letter was circulated among various e-mail lists and social media groups throughout Dallas and North Texas. It is realized that an online survey may produce more targeted results depending on where the survey can be circulated in a short amount of time. However, it does not assure high response rates, as can be seen from the numbers above. Another potential limitation is that the recruitment strategies used in this instance do not assure randomized sampling, which may have influenced the results.

**Not all of the survey results/findings are reported in their entirety due to LAF's online formatting restrictions, therefore the list only includes a sample of the survey findings. For further information, contact the UTA research team for this case study: Dr. Taner R. Ozdil, ASLA, tozdil@uta.edu.*

Economic Performance Benefits:

Performance Indicator.1:

- ***Generated $64.8 million in economic development (total lot revenue) by July 2017. Development spurred by the community will contribute to a projected 78.48% population increase between 2010 and 2017 in the Harvest Trade Area.***

Methods: Revenue raw data was collected from the client Hillwood Communities and further calculations were done by the UTA research team. Population data is collected from project market research provided by the client as well.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researchers' control.

Performance Indicator.2:

- ***Influenced 61.8% of survey respondents to purchase a home within the community when they took landscape into account as one of the factors.***

Methods: Harvest Community survey responses.

Limitations: This survey is conducted only on online platform due to resource, time, and permissions limitations. Online survey recruitment letter is circulated among various e-mail lists and social media groups throughout Dallas and North Texas. It is realized that an online survey may produce more targeted results depending on where the survey can be circulated in a short amount of time. However, it does not assure high response rates, as can be seen from the numbers above. Another potential limitation is that the recruitment strategies used in this instance do not assure randomized sampling, which may have influenced the results.

Performance Indicator.3:

- ***Increases property values for Harvest lots overlooking the Central Park area by 25.8% on average ($2.8 increase per sf) as compared to Harvest lots without a direct visual connection to landscape amenities.***

Sample Area Property Value Analysis			
Lot type	**Area (sf)**	**Total market value**	**Per sq ft**
PF	3,997.0	$ 483,066.00	120.9
PF	3,788.0	$ 459,852.00	121.4
PF	4,424.0	$ 493,967.00	111.7

PF	3,068.0	$ 406,830.00	132.6
PF	4,212.0	$ 581,096.00	138.0
PF	3,093.0	$ 407,469.00	131.7
PF	4,375.0	$ 496,103.00	113.4
PF	3,192.0	$ 415,000.00	130.0
	3,768.6	**$ 467,922.88**	**125.0**
NPF	3,208.0	$ 394,762.00	123.1
NPF	2,918.0	$ 372,600.00	127.7
NPF	3,745.0	$ 447,690.00	119.5
NPF	2,951.0	$ 360,000.00	122.0
NPF	2,561.0	$ 334,000.00	130.4
NPF	3,297.0	$ 380,500.00	115.4
NPF	3,695.0	$ 420,000.00	113.7
NPF	3,052.0	$ 334,000.00	109.4
NPF	2,195.0	$ 304,348.00	138.7
	3,069.1	**$ 371,988.89**	**122.2**

Method: Given data for property market value collected from Denton County Appraisal District and calculated for the sample area selected in the Harvest Community. Selected lots are marked in the image below. Yellow marks indicate the lots with a landscape view, whereas the orange marks indicate lots without direct visual connection to landscape. Average property value for a lot looking directly at the Central Park is $467,922.80 ($125.00 per sf), as opposed to an average lot without a visual connection to landscape amenities is $371,988.80 ($122.20 per sf) in Harvest.

The difference between average property value for PF and NPF lot types is $95,934. Percent increase on average would be:

95,934/371,988.8*100 = 25.8% increase

Limitations: Given that the data was collected from secondary sources, there may be inherent errors and/or omissions to such data beyond the researcher's control. Also, the reader must be aware that the economic impacts are calculated from a sample area.

Performance Indicator.4:

- ***There were 17 times more lots sold in 2016 compared to the total sale in 2013. Harvest sold 17 lots in 2013 and 306 lots in 2016. By March 2017, 23% lots of 3272 total were sold.***

Methods: Given data is obtained from client Hillwood Communities and further derived by the UTA research team.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researchers' control.

Performance Indicator.5:

- ***Reduces the Harvest landscape water consumption by 30%. Reduces homeowner water bills by 20-30% ($30-$45 per month).***

Methods: Data was collected from Hillwood communities.

Limitations: Given that the data was collected from secondary sources, there may be inherent errors and/or omissions to such data beyond the researchers' control.

Performance Indicator.6:

- ***Generated 20,071 meal donations to North Texas Food Bank with a value of $240,852 between 2013 and March 2017 as a result of agricultural operations on-site.***

Source: https://www.numbeo.com/cost-of-living/in/Dallas (The total cost for the overall meal donation is calculated using cost summary provided).

Method: Meal donation data was collected from the North Texas Food Banks.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researchers' control. Calculations are done considering the meal cost for Dallas localities.

Performance Indicator.7:

- ***Harvest has the highest closing with its 279 home sales (average 117.7) among the actively selling 8 comparable master planned communities within its region in 2016. Residence survey respondents indicated the top six reasons for moving to Harvest for them were: Community (62%), Location (54%), New Construction (47%), Schools (34%), Landscape Amenities (25%).***

Methods: Data is collected from the client Hillwood Communities as well as survey responses. The data is further analyzed by the research team.

Limitations: Given that the data was collected from secondary sources, there may be inherent errors and/or omissions to such data beyond the researchers' control. This survey is conducted only via online platform due to resource, time, and permissions limitations. It is realized that online survey may produce more targeted results depending on where the survey can be circulated in a short amount of time. However, it does not assure high response rates, as can be seen from the numbers above. Another potential limitation is that the recruitment strategies used in this instance do not assure randomized sampling, which may have influenced the results.

Performance Indicator.8:

- ***Family buyer segment (families with kids) represents 60% of the closings between 2014 and 2016. Families with children below 13 were the most active segment.***

Methods: Data is collected from the client Hillwood Communities as well as survey responses.

Limitations: Given that the data was collected from secondary sources there may be inherent errors and/or omissions to such data beyond the researcher's control. This survey is conducted only via online platform due to resource, time, and permissions limitations. It is realized that online survey may produce more targeted results depending on where the survey can be circulated in a short amount of time. However, it does not assure high response rates as can be seen from the numbers above. Another potential limitation is that the recruitment strategies used in this instance do not assure randomized sampling, which may have influenced the results.

Cost Comparison Calculations:

As part of the new Harvest Community master plan, the 1882-built historic Faught Family Farmhouse was strategically relocated within the property to a central location and converted to serve as a visitor center and a community landscape landmark. Total cost for restoration and relocation of the 1882-built historic Faught Family Farmhouse was $485K, as opposed to building a new one which is estimated at about $417K in this community. Such special expenditure was undertaken not only to promote Harvest's rural landscape heritage, identity, and appearance, but also to serve as on-site offices, and to provide gathering space for the community.

Methods: Secondary data.

Limitations: New construction is estimated from the Hillwood Communities website; it is subject to further review and may not reflect the actual cost.

Appendix - Sustainable feature:

- ***Provides habitat for 12 primarily Texas native tree species out of 20 planted. 51% (1,015) of the total number of trees (1,998) planted in Harvest are selected as native species for their importance to the ecosystem and to reduce overall water consumption and maintenance costs.***

Native trees species- Scientific name	Quantity of trees
FRAXINUS PENNSYLVANICA 'URBANITE'	127
QUERCUS MUEHLENBERGII	193
QUERCUS VIRGINIANA	69
TAXODIUM DISTICHUM	45
ULMUS CRASSIFOLIA	93
QUERCUS VIRGINIANA	6
JUNIPERUS VIRGINIANA	282
ULMUS CRASSIFOLIA	49
FRAXINUS TEXENSIS	5
ILEX DECIDUA	12
ILEX VOMITORIA	22
QUERCUS VIRGINIANA	21
PROSOPIS GLANDULOSA	45
CERCIS CANADENSIS	20
CARYA ILLINOINENSIS	26
Total	**1,015**

Source: Native trees species data is derived from https://www.wildflower.org/

Method: Tree species variety and quantity data were calculated from Construction Documents provided by TBG Partners and further calculation done by the research team.

Limitations: Given that the data was collected from secondary data, there may be inherent errors and/or omissions to such data beyond the researchers' control.

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