City Manager's Office
215 E. McKinney St., Denton, TX 76201 • (940) 349-8307

MEMORANDUM

DATE: June 22, 2018

TO: The Honorable Mayor Watts and Council Members

FROM: Todd Hileman, City Manager

SUBJECT: Friday Staff Report

I. Council Schedule

A. Meetings

1. Public Utilities Board Meeting on **Monday, June 25, 2018** at **6:00 p.m.** in the City Council Work Session Room.

2. ***No*** Council Airport Committee Meeting on **Tuesday, June 26, 2018** at **10:00 a.m.** in the City Hall Conference Room.

3. Open Session of the City Council on **Tuesday, June 26, 2018** at **11:00 a.m.** in the City Council Chambers, followed by a Work Session in the City Council Work Session Room; followed by a Special Called Meeting.

4. ***No*** Agenda Committee Meeting Wednesday, June 27, 2018.

5. Work Session of the Planning and Zoning Commission on **Wednesday, June 27, 2018** at **5:00 p.m.** in the City Council Work Session Room, followed by a Regular Meeting at **6:30 p.m.** in the City Council Chambers.

6. Development Code Review Committee Meeting on **Friday, June 29, 2018** at **11:00 a.m.** in the City Council Work Session Room.

II. General Information & Status Update

A. DME Lineworkers Rodeo information – DME received recognition from the American Public Power Association (APPA) that three (3) of our field employees (line-workers) achieved a "perfect score" on their written Lineman Rodeo exams during the APPA Lineman Rodeo competition in North Carolina on April 28. The DME team of Curtis Espedal, Garrett Dillar, and Tyler Rinck, correctly answered all questions on the written exam. At this year's Rodeo, there were close to 400 competitors from across the country. The event allows line-workers to demonstrate their dedication to, and pride for, the work that they safely perform,

while developing skills which ultimately benefit the citizens and customers of public power electric utilities. APPA provided the **attached** letter of recognition on June 15. Pictures from the event are also **attached**. Staff contact: George Morrow, DME

B. Ethics Ordinance Key Dates Ethics Ordinance Key Dates – During the adoption of the Ethics Ordinance, City Council requested that staff target September 1, 2018 as the implementation date for the Ordinance. Staff is continuing to work with the City's consultant, Alan Bojorquez, as he drafts the training and administrative materials for the Ethics Ordinance. Below is a list of key dates in the upcoming weeks to meet the target date identified by City Council:
   - June 26 - City Council nominations to the Board of Ethics.
   - July 16 - An ethics training for City Officials is scheduled with Alan Bojorquez at 6:00 p.m. in the City Hall Council Chambers. An email providing more information of the training was sent today to City Council, and members of the Planning & Zoning Commission, Zoning Board of Adjustments, Historic Landmark Commission, and Public Utilities Board.
   - July 17 - Appointment of Board of Ethics nominees by majority vote of the City Council.
   - Week of July 23 - Initial meeting of the Board of Ethics to receive training, and draft rules and procedures for future approval by City Council.
   - August - Review, discussion, and approval of the Board of Ethics rules and procedures.
   - September 1 - City Council requested implementation date for the Board of Ethics.

   Staff contact: Bryan Langley, CMO

C. Courthouse on the Square Sidewalk Reconstruction – Last week, staff provided an update on the County's reconstruction of the sidewalks around the Courthouse with the City participating to coordinate replacement of the curb and gutter around the Square at the same time. A letter was sent this week from the Denton County Department of Facilities with more details (see **attached**). Construction is set to begin in August. To minimize impacts to the many users of the Square, construction will be limited to one side of the Square at a time. Construction equipment and materials will be completely removed from the Square the weekend of September 8 for the Arts and Autos Extravaganza, and the weekend of October 27 for the UNT Homecoming Parade and the Day of the Dead Festival. All work is to be complete by November 21, 2018. This letter and information has been distributed to the downtown businesses. Staff contact: Todd Estes, Capital Projects / Julie Glover, Economic Development

D. Update on Work Session Kitchen Area and Bathroom Reconfiguration – As a follow-up to the information provided in the June 1 Friday Staff Report, work to enhance the functionality of the kitchen area and add an additional restroom near the Work Session Room will begin Friday, June 29. Facilities Management staff is going to try to minimize the impact of the construction on daily City Hall operations by working primarily on nights and weekends. The majority of the construction project is scheduled to take place during the Council break, with a goal of having the kitchen area and new bathrooms usable by the July 17 City

Council Meeting. Throughout the reconfiguration project, Facilities Management plans to keep the City Council Office open, but there may be times when construction noise impacts the utility of the space. Please coordinate with Robin Fox or Karisa Richards should you have questions about the availability of the City Council Office or need to identify an alternate space to conduct City business. Staff will continue to provide updates as progress is made on this project. Staff contact: Bryan Langley, CMO

E. Lynn Ford Door Installation – Facilities Management installed two doors carved by Lynn Ford in the main City Hall entryway on June 20. Lynn Ford was a craftsman and cabinet maker who often collaborated with his brother, architect O'Neil Ford on signature building projects. These historic doors played an integral role in O'Neil Ford's original design for City Hall and were used for several decades in the building's entryway. The doors are now artfully displayed to protect them from the elements and to allow people to admire Lynn Ford's craftsmanship. Please see to the right a picture of the new Lynn Ford door display in City Hall. In the coming weeks, staff will add photos of Denton's former mayors and city managers to the same wall where the doors have been installed and will move photos of the current City Council to the Council Chamber entry. Staff will provide additional updates once the photos have been installed. Staff contact: Mario Canizares, CMO

F. Library State Accreditation - The Denton Public Library received notification this week from the Texas State Library and Archives Commission (TSLAC) that it has met all pertinent accreditation criteria for continued accreditation for the upcoming fiscal year. Public libraries across the Texas submit a Texas Public Libraries Annual Report annually. Information collected in the report is used to evaluate public libraries and award TSLAC accreditation. Accreditation allows the Denton Public Library to participate in multiple State programs and apply for competitive grants. One significant benefit of TSLAC accreditation is the TexShare card program, which allows Denton Public Library patrons to check out materials at other TexShare card participating libraries. The TexShare program also provides multiple online databases and learning resources at a significant discount to Denton. In 2017, Denton Public Library paid $4,935 for $278,437 worth of online databases such as Pronunciator, Learning Express, EBSCO research databases, HeritageQuest, and more through the TexShare database program. The Library also participates in the statewide interlibrary loan program and receives a TSLAC reimbursement grant annually of approximately $20,000-$25,000. Staff contact: Jennifer Bekker, Director of Libraries

G. RYLA Program – The City partnered with the Denton Rotary Club and Rotary Youth Leadership Awards (RYLA) program again this year to host a mock City Council meeting for high school students on the evening of Friday, June 15 in the Council Chambers. The following day, the RYLA students volunteered at Clear Creek Natural Heritage Center – **attached** is a brief description of the work they

performed and some photos. Staff contact: Sarah Kuechler, Public Affairs / Katherine Barnett, Sustainability

H. Vela Athletic Complex Construction Update – Construction began on May 21 at the G. Roland Vela Athletic Complex. The Complex is located in North Lakes Park and is named after retired University of North Texas professor and former City Council Member, Dr. G. Roland Vela. Denton residents approved the construction of the 26.6 acre complex as a part of the 2005 and 2015 bond elections. Earthwork on the project is now 75% complete, all four fields are anticipated to be ready for the installation of irrigation and utilities beginning the week of June 25. Sod installation is scheduled for mid-August, and the project is currently projected to reach final completion by March 2019. Once completed, the complex will include four fenced and lighted athletic fields, a parking lot, playground, pavilion, and a new restroom and concessions building. Please see below pictures of construction progress at the Vela Athletic Complex. Staff contact: Mario Canizares, CMO

I. Recreation Center Wi-Fi and After School Technology – During the June 12 City Council meeting, a request was made for information regarding the availability of Wi-Fi or wireless internet connection at city-owned recreation centers and the possible partnerships between the Park and Recreation Department and the Denton Public Library in offering technology access to youth. The following Park and Recreation Centers currently provide free Wi-Fi access:

- Civic Center (After School Action Site location)
- Denia Recreation Center
- North Lakes Recreation Center

The MLK Jr. Recreation Center has an internet hotspot that allows for wireless connection in the workout area and a portion of the gym. Other Park and Recreation facilities with Wi-Fi are the Aquatics Center, Civic Center Pool, North Lake Golf Center, and the Senior Center. Additionally, Denia and MLK Jr. Recreation Centers both have computer labs with two computer stations at each center. The computer stations are available for use by recreation pass holders on a first-come, first-served basis.

Wi-Fi access is currently available at all library branches. A library card is not required in order to access Wi-Fi in the libraries. Public access computers with internet and Microsoft Office software are also available for all full-service cardholders, regardless of age. iPads are available in all children and teen areas in every library location. iPads are pre-loaded with educational games and activities. Any child or teen may use an available iPad on a first-come, first-served basis. No library card is required. Laptops are available for checkout at all library branches. Laptops may be checked out to adults (18 years or older) with a full-service library card in good standing (no fees or fines) and used inside the library facility for 2 hours.

The Denton Public Library has noticed a trend of increased Wi-Fi usage and decreasing public access computer access. As technology hardware becomes more available, library patrons are bringing in their own laptops, tablets, and smartphones to connect with the Library's Wi-Fi. The need for high-speed, reliable Wi-Fi access is growing while the use of traditional desktop computers is in decline.

The Park and Recreation Department and the Public Library are collaborating to explore opportunities for joint programming to address community technology needs. Staff will be proceeding to expand Wi-Fi access at the MLK Jr. Recreational Center and studying the needs related to technology access for youth. Staff contact: Laura Behrens, Park and Recreation/Jennifer Bekker, Library

J. Jim Christal Road Closure - Due to construction activities associated with the new United States Cold Storage facility, Jim Christal Road west of Interstate 35 will have intermittent lane closures starting Monday, June 25. Beginning Monday, July 2 the full road from approximately Interstate 35 west to Western Boulevard will be closed. Construction activities are expected to last approximately 60 days, and detour signs will be in place prior to the full road closure. Staff will continue to provide updates as additional information is made available. The approximate area of road closure is outlined in red on the map below. Staff contact: Scott McDonald

K. Skate Works Park Public Meeting - The Parks and Recreation Department invites interested members of the community to attend a public meeting to provide input on Skate Works Park. The meeting will be an open house format on Wednesday, June 27 from 6:30 to 7:30 p.m. in the main community room at Denton Civic Center, 321 E. McKinney St. Staff representatives from Parks and Recreation, including Director Gary Packan, will be on hand to receive input on current skate park equipment and elements and/or amenity replacements. Skate Works Park is free and open daily from 6 a.m. to 10 p.m. with the exception of closing for scheduled clinics and camps. The skate park is located at 2400 Long Rd. adjacent to Water Works Park. If unable to attend, residents are encouraged to please email input to parksnrec@cityofdenton.com. For more information, visit www.dentonparks.com. Staff contact: Gary Packan, Parks & Recreation

L. Fire Station 4 Dedication Ceremony – The Denton Fire Department hosted a dedication ceremony for the new Fire Station 4 this morning with many members of the community in attendance. The event featured remarks from Fire Chief Kenneth Hedges and Mayor Chris Watts, a ceremonial fire hose uncoupling (in place of ribbon cutting – pictured below), and a traditional push-in of the fire engine with assistance from members of the community. A few pictures from the event will be shared on the City's social media. Staff contact: Fire Chief Kenneth Hedges

M. Engage Denton Application – The City of Denton launched the Engage Denton application this Monday, June 18 and a press release was sent to the City's media contacts. There have been a total of 116 users that have signed up in the first week and a total of 53 service requests have been submitted. Staff received multiple positive comments from citizens regarding the application and ease of use in requesting services from the City. Staff will continue to provide updates to the City Council as the pilot program progresses. Staff contact: Sarah Kuechler, Public Affairs

N. Construction Requirements for Substandard Buildings – The City of Denton has a substandard building program that is coordinated by the Community Improvement Services Division (CIS). This division seeks to address dangerous or blighted structures to prevent issues such as vagrancy, trespassing, criminal activity, vandalism, tall grass and weeds, illegal dumping, and fire hazards. CIS has a designated Dangerous Buildings Officer who is responsible for coordinating with property owners to address safety concerns and rehabilitate substandard structures.

During the June 19 City Council Meeting, an inquiry was raised about requirements to secure the perimeter of substandard buildings that are in the process of being rehabilitated. The Building Inspections Division does not have specific security requirements for the construction of new homes, remodels, commercial construction, or fence construction unless there are large holes in the ground or other significant safety hazards. The property in question, 815 Lakey Street, is properly permitted and the interior is being fully rehabilitated. Once complete, the interior and exterior of the structure will be brought up to current building codes and will help to further enhance the aesthetic and stability of the neighborhood. Specific questions about substandard buildings can be addressed by Heather Dow, the CIS Dangerous Buildings Officer at (940) 349-7451 or heather.dow@cityofdenton.com. Staff contact: Scott McDonald, Development Services/Lancine Bentley, Fire –Community Improvement Services

III. Community Events

IV. Attachments

A. Letter from APPA and photos from Line Workers Rodeo
B. Letter from Denton County regarding sidewalk reconstruction
C. RYLA Volunteer Project at Clear Creek

V. Informal Staff Reports

A. 2018-077 Southlake SPIN Program
B. 2018-078 Solid Waste Operational Review & Staffing Analysis

VI. Council Information

A. Council Requests for Information
B. Draft Agenda (***No*** draft agenda)
C. Council Calendar
D. Future Council Items
E. Street Construction Report

AMERICAN PUBLIC POWER ASSOCIATION
Powering Strong Communities

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www.PublicPower.org

June 15, 2018

George Morrow
General Manager
Denton Municipal Electric
1659 Spencer Road
Denton, TX 76205

Dear George:

On behalf of the American Public Power Association (Association), I would like to congratulate Denton Municipal Electric's team #159, Curtis Espendal, Garrett Dillard, and Tyler Rinck, for achieving a perfect score at the 2018 Public Power Lineworkers Rodeo, hosted by ElectriCities of North Carolina, Inc., North Carolina Association of Municipal Electric Systems, and the Town of Wake Forest in Raleigh/ Wake Forest in North Carolina. Denton Municipal Electric is one of only twenty teams that accomplished a score of 500 this year in the team competition, and, in doing so, outperformed top competitors from across the nation. Additionally, the Association would like to thank your utility for supporting this event. Each year, the Association strives to provide an environment for professional lineworkers to learn, network, and compete with peers from across the national public power community. We hope that we succeeded in this goal while providing a valuable experience for all individuals involved.

Denton Municipal Electric's journeyman team demonstrated precision, agility, and, most importantly, safety throughout the completion. This year, almost 400 competitors – 65 journeyman teams and 144 apprentices – from across the country proved their dedication to and pride for the work they do on public power's behalf. To review all results, please visit PublicPower.org/Rodeo.

I hope your lineworkers enjoyed their experience in North Carolina and that they will join us for the 2019 Public Power Lineworkers Rodeo, hosted by Colorado Springs Utilities, March 29-30, 2019 in Colorado Springs, CO.

Thanks again for supporting the 2018 Public Power Lineworkers Rodeo.

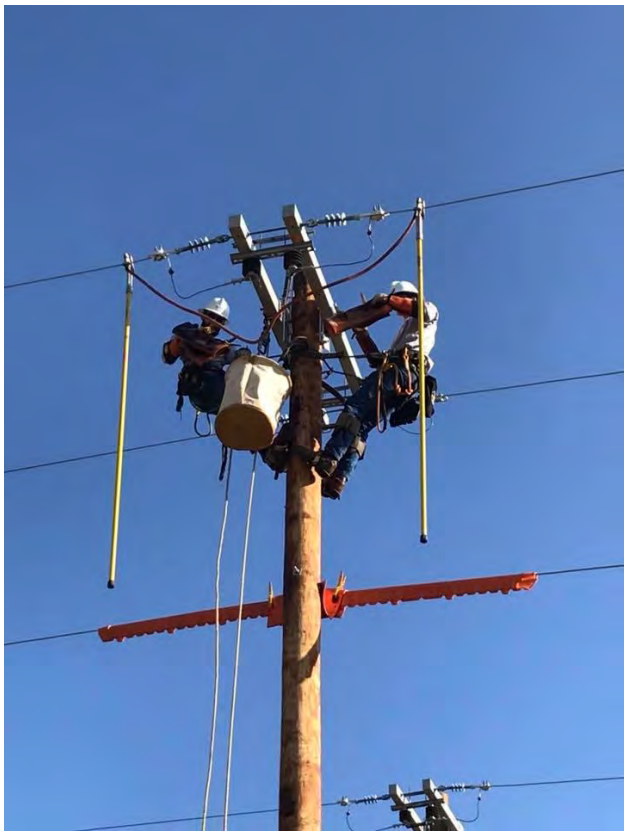
Sincerely,

Michael J. Hyland

Michael J. Hyland
Senior Vice President, Engineering Services
American Public Power Association

CC: Misty Willis

LINE WORKERS RODEO



Denton County
Department of Facilities

750 S. Mayhill Rd., Suite B121, Denton, Texas 76208
Phone: (940) 349-2970 Fax: (940) 349-2971

Danny Brumley
Director

Dale Nelson
Assistant Director

Melody David
Office Administrator

Courthouse on the Square Sidewalk Reconstruction Planned

Construction is set to begin in August to reconstruct the sidewalks around the Courthouse on the Square. Denton County is spearheading the project, with participation by the City of Denton.
The project will consist of replacement of damaged sidewalks immediately around the Courthouse, as well as replacement of all the curbs and sidewalks around the perimeter of the Courthouse lawn.

The work will dovetail with the traffic signal and ramp reconstruction recently completed by the City of Denton. The existing sidewalks along the streets around the Courthouse were constructed in 1935 or 1936 as part of the Works Progress Administration (WPA). The WPA was a federal program established to provide jobs during the Great Depression. There are several sidewalk panels stamped with the WPA nameplate. To the extent possible, those panels will be removed and preserved for future display.

The location of that display has not yet been determined. Because the Courthouse on the Square is designated as a State Antiquities Landmark, Denton County submitted the project to the Texas Historical Commission for approval. That approval was granted in January 2018.

To minimize impacts to the many users of the Square, construction will be limited to one side of the Square at a time. Construction equipment and materials will be completely removed from the Square the weekend of September 8 for the Arts and Autos Extravaganza, and the weekend of October 27 for the UNT Homecoming Parade and the Day of the Dead Festival. All work is to be complete by November 21, 2018.

Thank you,

Danny Brumley
Denton County
Director of Facilities
940-349-2970
danny.brumley@dentoncounty.com

Clear Creek
Natural Heritage Center

JUNE 16, 2018

DETERMINATION & TEAM WORK

RYLA IN ACTION

Members of RYLA 5790 (Rotary Youth Leadership Awards) and the Denton Rotary Club teamed up with Sustainable Denton and traded their Saturday for a service project at Clear Creek Natural Heritage Center. More than 157 people volunteered their time to beautify the surroundings, remove invasive species, to construct benches, and to maintain and mulch pollinator beds.

Date: 6/22/2018 Report No. 2018-077

INFORMAL STAFF REPORT
TO MAYOR AND CITY COUNCIL

SUBJECT:
Provide information on the Southlake Program for the Involvement of Neighborhoods (SPIN)

EXECUTIVE SUMMARY:
As a concluding item at the June 12, 2018 City Council meeting, Council Member Briggs requested information on the Southlake Program for the Involvement of Neighborhoods (SPIN) program as an example of citizen engagement during the planning process. SPIN is a voluntary program that incorporates community involvement and feedback by having developers and City departments present plans at town hall forums prior to taking items to the Planning and Zoning Commission and City Council. During these town hall forums, community members are able to have informal conversations and provide public comment on developments. Residents have the opportunity to either ask questions at the forum or give feedback in person or via an online survey. Notes and comments from these forums are considered by developers and are included in the backup information provided to the Planning and Zoning Commission and City Council. Meetings are held on the second and fourth Tuesday of each month, and are broadcast on the City's cable channel and online.

BACKGROUND:
The SPIN program began in Southlake in the 1990s as a way to allow and encourage citizen input into proposed projects that directly affect them. Since that time, the application of the program has evolved but the overarching goal has remained the same, to provide citizens the opportunity to be engaged in the development process and other topics of interest. The SPIN meetings are hosted by Southlake's Community Engagement Committee, a committee of seven Southlake residents who have been appointed by the City Council for two-year terms.

In order to make items more neighborhood specific, the City of Southlake is separated into 11 SPIN districts. As part of the development process, developers contact the SPIN staff liaison to schedule a presentation at a SPIN meeting. Staff then advertises the items to the public and inform residents of which SPIN district the project affects.

The SPIN meetings are posted and are open to the public. If there are no topics for discussion, then meetings can be cancelled at the Committee's discretion. During the meetings, the Vice-Chair of the Community Engagement Committee serves as the moderator and meetings are held in Southlake's Council Chambers. Developers or builders present plans to interested residents, who are then given the opportunity to engage in the process by asking questions or commenting on the proposals. Because the meetings are televised, a survey link is provided for citizens to give feedback digitally if they are unable to attend the meetings in person.

Following SPIN, a proposed development may be submitted to the Planning Department, reviewed by staff, and scheduled for a Planning and Zoning Commission meeting. The item would then be eligible to move forward to City Council for consideration. Staff from the Planning and Development Services department attend the SPIN meetings and take notes, which are compiled

into a SPIN report and included in all backup information for the Planning and Zoning Commission and City Council (see attached example). This is an important step in the process because the presenter then has the option of altering plans based on comments, or moving forward as is. The Planning and Zoning Commission and City Council then know that projects have had the opportunity for public feedback, and what actions, changes, or accommodations have been made as a result of that feedback. City of Denton staff contacted the SPIN liaison for the City of Southlake to discuss the program. The Southlake staff commented that meetings are well attended, and developers are comfortable with the process.

The City of Southlake also uses SPIN meetings as a way to receive public input about a variety of municipal projects including new municipal building plans, major road construction, and strategic initiatives. Because of the success of the SPIN program, the City has also partnered with the local school district to hold a School Board Election Town Hall Meeting and other special topics.

DISCUSSION:

Based on the information received from the City of Southlake, the City of Denton could implement a program similar to SPIN into the development process during the pre-submittal phase. Although it is not required, many large scale City projects, such as electric substations or major road reconstructions, do already involved some sort of community meeting or forum to solicit feedback, however they are not formally required as part of the development.

If a similar program were implemented in Denton, it would require additional staff time and resources to develop and implement. The City of Southlake includes the following responsibilities in addition to other duties of those staff members:

- Staff liaison: Receives requests, schedules presentations, and coordinates with Community Engagement Committee. This is currently performed by a principal planner in the Planning and Development Services department.
- Staff to attend meetings: Staff from Planning and Development Services rotate to have one staff member attend each meeting to take notes and answer clarifying questions.
- Television Staff: Because the meetings are televised, there is a requirement for staff to work during the meetings.

Although there is no current Council appointed board in Denton that aligns with Southlake's Community Engagement Committee (a seven person, Council-appointed board), a program like SPIN could be housed underneath another board or committee, or operate under a new heading or possibly underneath the Planning and Zoning Commission.

ATTACHMENT(S):

Sample SPIN report from June 12, 2018 meeting

STAFF CONTACT:

Sarah Kuechler
Director of Public Affairs
Sarah.Kuechler@cityofdenton.com
940-349-8356

SOUTHLAKE

SPIN MEETING REPORT

SPIN Item Number:	SPIN2018-27
City Case Numbers:	ZA18-0011
Project Name:	Zoning change and concept plan for two residential lots on approximately 15.23 acres
SPIN Neighborhoods:	SPIN #1
Meeting Date:	June 12, 2018
Meeting Location:	1400 Main Street, Southlake, TX City Council Chambers
Total Attendance:	4
Host:	Ben Siebach, Community Engagement Committee
Applicants Presenting:	Jason Rawlings representing Mike Lamon Jason Rawlings: email: jason@millersurveying.com; phone: 817-796-9714 Michael Lamon email: michael.lamon@outlook.com; phone 817-233-5046
City Staff Present:	Patty Moos, Planner

Presentation begins: 6:09 pm Presentation ends: 6:14 pm

Town Hall Forums can be viewed in their entirety by visiting http://www.cityofsouthlake.com and clicking on "I Want to" and "View" "Video on Demand" – forums are listed under SPIN by meeting date.

FORUM SUMMARY:

Property Situation: Immediately west of 275 E. Bob Jones Road.

Details: A zoning change and concept plan for two residential lots on 15.2 acres. The west lot is a proposed 6.26 acre parcel of property located immediately west of 275 E. Bob Jones Rd is being rezoned from agricultural to "SF-2" single family residence is intended to be built on the proposed 6.26 acres.

Presentation: Currently the western lot is zoned "AG" Agricultural District and eastern lot is zoned "RE" Single Family Residential Estate District. East lot has a residence on it. Applicant is moving the west property line 90 ft. west and incorporating the additional property into one 8.66 acre lot and rezoning the lot as "RE-5". The western remaining tract of land will be rezoned to "SF-2" Single Family Residential District for the 6.26 acres. No plans to subdivide the west lot and to sell it off as a single lot.

275 E Bob Jones Rd.

Zoning Change & Replat

Questions and Concerns:

1. Where is the property located? North of Bob Jones Park on E. Bob Jones Road. Located in Denton County. There are no structures on the west lot and an existing house is on the east lot.

2. Is there going to be more than one lot on the west property? The owner wants to expand his lot.

3. Is the lot under contract? The owner has one buyer contingent on the rezoning on the rezoning of the property.

4. How many acres is the west lot? 6.26 acres. East lot is 8.6 acres and a single platted lot.

Southlake Connect Results for the June 12, 2018 SPIN Town Hall Forum

Detailed Notification Analysis

SPIN Town Hall Forum - June 12, 2018

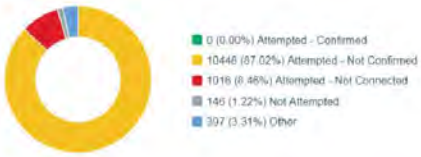
Details

Notification ID	8105604015306587
Notification Type	Standard
Start Date	2018-06-11
Start Time	14:18:10 CDT
Confirmation Requested	No
Call Throttling	Yes
Duration	4 hr(s)
Message Format	Voice/Text
Voicemail Preference	Message Only
Delivery Order	Organization Default

Delivery Methods

1. Primary SMS
2. Secondary SMS
3. Primary Email
4. Primary Mobile
5. Secondary Email
6. Secondary Mobile
7. Home Phone
8. Home Phone #2
9. Business Phone
10. TTY / TTD Device

Call Results



Hide details

Call Results(per Delivery Path)	Total	% of Total
Attempted - Not Confirmed		
Not Delivered - Voicemail Hung Up	888	7.40%
Delivered	566	4.71%
Not Delivered - Recipient Hung Up	2212	18.42%
Delivered - To Voicemail	2700	22.49%
Sent	928	7.73%
Not Delivered - No Answer	3164	26.27%
Attempted - Not Connected		
Not Delivered - Invalid Number	141	1.17%
Not Delivered - Line Busy	125	1.04%
Not Delivered - Out of Service	750	6.25%
Not Attempted		

	Business Phone	2895	1	0	16	7	0	0	0	0	2919
	TTY / TTD Device	0	0	1	1	9	0	0	0	0	11
2018-06-11 14:23:19 Sub Totals		10955	373	244	132	85	0	0	0	0	11789
2018-06-11 14:26:27	Primary SMS	0	0	0	0	0	0	0	0	0	0
	Secondary SMS	0	0	0	0	0	0	0	0	0	0
	Primary Email	0	0	0	0	0	0	0	0	0	0
	Primary Mobile	0	0	0	0	0	0	0	0	0	0
	Secondary Email	0	0	0	0	0	0	0	0	0	0
	Secondary Mobile	0	0	0	0	0	35	0	0	0	35
	Home Phone	0	0	0	0	0	1	5	0	0	6
	Home Phone #2	0	0	0	0	0	1	1	0	0	2
	Business Phone	0	0	0	0	0	5	8	3	0	16
	TTY / TTD Device	0	0	0	0	0	4	1	1	1	7
2018-06-11 14:26:27 Sub Totals		0	0	0	0	0	46	15	4	1	66
Totals		10955	373	244	132	85	46	15	4	1	11855

Not Delivered - Duplicate Path	144	1.20%
Not Delivered - Contact Path Not Defined	2	0.02%
Other		
Not Delivered - Downstream Communication Error	20	0.17%
Not Delivered - Contact Unavailable	364	3.03%
Not Delivered - Downstream Temporary Error	7	0.06%
Not Attempted - Unsubscribed	6	0.05%

Attempts Over Time

Hide details

Attempt Time	Delivery Method	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Attempt 6	Attempt 7	Attempt 8	Attempt 9	Totals
2018-05-11 14:23:19	Primary SMS	321	0	0	0	0	0	0	0	0	321
	Secondary SMS	0	109	0	0	0	0	0	0	0	109
	Primary Email	80	207	106	0	0	0	0	0	0	393
	Primary Mobile	6	45	117	78	0	0	0	0	0	246
	Secondary Email	0	2	11	27	47	0	0	0	0	87
	Secondary Mobile	1	8	4	5	19	0	0	0	0	32
	Home Phone	7652	2	5	6	3	0	0	0	0	7668
	Home Phone #2	0	0	0	1	0	0	0	0	0	1

Date: June 22, 2018 Report No. 2018-078

INFORMAL STAFF REPORT
TO MAYOR AND CITY COUNCIL

SUBJECT:

Operational review and staffing analysis of the Solid Waste department

BACKGROUND:

Staff recently executed a professional services agreement with solid waste consulting firm Blue Ridge Services, Inc. to conduct an operational review and staffing assessment of the Solid Waste Department's landfill and collections operations.

As part of the engagement, Blue Ridge performed a thorough review of Solid Waste's operational data and examined the department's policies, standard operating procedures, and organizational structure. The firm recently spent several days onsite conducting interviews with Solid Waste staff, observing critical processes, and evaluating the effectiveness and efficiency of the department's operations.

The results of Blue Ridge's evaluation include recommendations to eliminate underperforming programs, increase efficiency in core operations, and reorganize the department's reporting structure.

The City Council will receive a summary of Blue Ridge's findings during the work session portion of the June 26 Council meeting. To supplement the firm's presentation, a copy of the firm's complete report is attached for Council review. An Operational Recommendations Action Plan outlining staff's responses to the Blue Ridge findings will be discussed during this meeting. Staff would like to stress that all recommendations from Blue Ridge to eliminate underperforming programs will be discussed in detail with the Public Utilities Board and City Council on an individual basis and Council recommendations will be obtained before any actions are taken.

ATTACHMENT(S):

Blue Ridge – Operational Review & Staffing Assessment

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Operational Review & Staffing Assessment

City of Denton Solid Waste & Recycling Department

Prepared for:
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Table of Contents

List of Abbreviations

ADC	Alternative Daily Cover
AUF	Airspace Utilization Factor
BMR	Building Material Recovery
BMP	Best Management Practice
BRS	Blue Ridge Services, Inc.
City	City of Denton
CDC	City of Denton Collections
CDL	City of Denton Landfill
DMED	Denton Municipal Electric Department
DTE	DTE Biomass Energy
ELR	Enhanced Leachate Recirculation
FSP	Fill Sequence Plan
FY	Fiscal Year
NCTCOG	North Central Texas Council of Governments
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Administration
PCC	Pancake Cell Construction *(system)*
SMP	Soil Management Plan
SWRD	City of Denton Solid Waste & Recycling Department
TTP	Typewriter Tipping Pattern
WWTP	Wet Weather Tipping Pad

Executive Summary

- The City of Denton Solid Waste and Recycling Department (SWRD) contracted Blue Ridge Services, Inc. (BRS) to perform a thorough review of the City of Denton Landfill (CDL) and Collections (CDC) operations, with one of the key goals being development of a staffing model for each operation. This review occurred through questionnaire responses, documents review, data analysis, and onsite visits by Neal Bolton, Ron Proto and Kasem Cornelius. Our team spent 96 -hours on-site.

Landfill

- By planning ahead for both long and short-term operations, significant savings and efficiency improvements can be made to operations and landfill airspace utilization. BRS recommends the following for the landfill:
  - Development of a Soil Management Plan;
  - Development of a Fill Sequence Plan;
  - Construction of Wet Weather Tipping Pad;
- We recommend that processing rubble in-house be discontinued. According to Fiscal Year 2015-2017 Proformas, 205,474 tons of processed material has remained on-site in the last 3 years, and a combined loss of $387,039 has occurred due to the rubble-processing operation. Most rubble can be used as-is for other on-site purposes, with minimal processing and, with strategic planning, the annual quantity can be reduced – helping preserve valuable landfill airspace;
- Proformas also indicate that the Building Material Recovery (BMR) operation caused a combined loss of over $800,000 in Fiscal Years 2015 and 2017. Based on our observations of ongoing financial losses, expensive specialized equipment required, operational inefficiencies, poor utilization of staff, as well as the current recycling commodity markets, we recommend that SWRD discontinue BMR operations. Efforts to increase airspace utilization should be refocused toward improving landfill waste compaction and reducing cover soil usage. Landfill life expectancy and operational efficiency can be increased to a far greater degree using these methods than grinding material for size reduction – and at much lower cost;

- We see little long-term value being added to the landfill through the Enhanced Leachate Recirculation (ELR) operation. We recommend that SWRD decrease/discontinue ELR operations. Airspace utilization should instead be improved by implementing industry best management practices for waste compaction and cover soil processes;
- Tipping pad operations should be modified to allow more space and better organization for vehicle placement and sequencing;
- Stockpiles of soil, rubble and processed aggregate should be strategically located so as to better monitor inventory and consumption, maximize airspace by well-planned surcharging, and minimize first-time and subsequent multiple-handling.
- The waste compaction process can be dramatically improved by changing the layout of the active face – and by consistently tracking and regulating the compactor's hour-by-hour production rate.
- A significant quantity of landfill airspace can be preserved by expanding the use of Alterative Daily Cover (ADC).
- We recommend that a program be initiated to track the performance of key landfill activities, including: machine hours, inbound waste tonnage, soil consumption, cover soil ratio, and other key operational metrics.

Collections

- Residential recycling route productivity is low. The drivers drive by the same number of houses as the MSW drivers, yet they collect only 22% of the residential tonnage. The low tonnage could indicate that the recycling cart setout rate (the number of carts set out on any given collection day) is as low as 50%, or that the carts are between 25 to 50% full. CDC should audit the residential recycling routes for the setout rate and cart volume, then adjust the routes accordingly. It's possible the route audits will show that recycling could be collected every other week;
- Yard waste routes have a two-person crew. They drive by almost 2,000 houses making about 128 collections per day and averaging less than four tons per load. If a pile has large material, a grapple truck driver is contacted to assist with collecting the material. The grapple trucks make about 18 collections per day. The yard waste collection system is slow, inefficient, leaves a mess, and is unsafe. CDC should consider using a cart-based system like residential MSW collection. A cart system is cost-effective, in addition to being fast, clean, and safe for the driver;
- CDC provides bulky item collection, a valuable service to the residents. The crews average 35 collections a day, low by industry standards, which can range from 100 to 200 collections per day. CDC should consider running the bulky collection route every other week or every third week to increase collections to 70 or 100 per day. The schedule can be seasonally adjusted based on the service history;

- We recommend that SWRD discontinue the HCC residential collections service, and instead obtain the appropriate permitting to operate as a regional drop-off facility only;
- The commercial MSW front-loader routes average 102 lifts per day. The lift count is low considering the drivers drive directly to the bin to lift and empty it, occasionally exiting the truck to open and close the gate for a bin enclosure. This is a very efficient way to collect front-loader bins and should allow a lift count of 125 to 150 per day, more in line with industry standards. CDC should eliminate one Monday through Friday and one Saturday route. This change would increase the Monday through Friday routes lift count to about 120 per day;
- CDC has a complex schedule for commercial recycling using half-day and full-day routes, Monday through Friday. The lift count average is 68 per day with a payload a little over three tons, less than 50% of the trucks carrying capacity. CDC should consider a complete review of the commercial recycling system, then redesign the routes to increase their lift count to around 150 per day, in line with the industry standards for commercial front-loader recycling routes;
- Federal Motor Carrier Safety Administration (FMCSA) regulation 396.11, "Driver Vehicle Inspection Report," will require the CDC to revise their post-trip Driver-Vehicle Inspection Report (DVIR) procedure. The new procedure must require that a copy of the DVIR remain in the vehicle, so the mechanic can certify that any necessary repair(s) was performed, and so that the driver can sign off that he reviewed the previous report and acknowledges that any necessary repairs were certified as being completed;
- In a sample of more than 68,000 collections loads, 32% exceeded 54,000 pounds, the Texas Department of Transportation's (DOT) gross vehicle weight limit. More than 4% of those loads exceeded 66,000 pounds, the manufacturer's maximum gross vehicle weight (MGVW) limit. Driving a vehicle heavier than allowed by DOT's weight regulations is not a good practice. Driving a vehicle above the MGVW limit is dangerous. Supervisors should monitor truckload weights daily and bring overweight loads to the drivers' attention. Drivers should be instructed to adjust their loads as necessary. Supervisors and drivers need to be accountable for delivering legal weight loads to post-collection facilities;
- The Mantis front-loader truck body has a design flat that allows debris to make its way on the packer blade roller track and disrupt the sensors, not allowing the packer blade to function correctly. Drivers climb on the side of the truck body to clean the sensors that regulate the packing blade. Climbing on the truck without proper safety equipment is a dangerous practice that should be discontinued. CDC should work with the Fleet Services Department and the manufacturer to develop an engineered solution to resolve this problem or devise a safe procedure to clean the track to allow the packing blade to function correctly;

- Truck repairs takes too long to fix is a major complaint and a source of driver frustration; consequently, drivers avoid dropping off their truck for repairs unless it's absolutely necessary. Drivers mentioned that they don't report broken rearview cameras because of the delay in getting their truck back. This is a dangerous practice and should be corrected immediately;
- A written technical training program for new and veteran drivers should be developed and all trainers should be required to follow it. The program should include classroom, yard, and on-the-job training. It is imperative that the training curriculum for each model truck be based on the manufacturer's operating manual. Every drivers should be recertified every two to four years for continuing education and a refresher-training program.

Safety

- BRS noted the absence of a safety culture during the on-site visit. The BRS team did not notice a safety poster, sign, or slogan anywhere on the site. Most drivers wear the minimum high visibility apparel, a gray shirt with orange stripes. Supervisors, office personnel, and managers do not wear a high visibility safety vest when in the yard, in the shop, or in the field. A strong safety culture is built over time, by management's relentless commitment to protecting worker's health and welfare. This starts and the top and must be consistently encouraged and monitored. Workers will respect what management inspects.
- BRS recommends the implementation of regular safety meetings with topics focused on applicable (and historical) safety topics. These should be reinforced during regular and frequent tailgate meetings and morning huddles to instill safety consciousness in equipment operators, laborers, technical staff, drivers, supervisors, managers, and office personnel.
- BRS also recommends that SWRD develop and implement comprehensive Standard Operating Procedures (SOPs)for all CDL and CDC tasks.

Organizational Structure

- Appendix A contains the revised Organizational Chart recommended by BRS;
- CDC has a staff of 70 employees; 84 percent are directly involved with the collection operation. Management accounts for 16 percent of the staff. Reorganizing the division as recommended will reduce management staff to 10% and increase the supervisors' span of control to 11 or 12 routes with a headcount of 13 to 14. Both moves bring the Department's management to frontline worker ratio in line with industry standards;
- We do not see special projects and new operational processes being implemented on the scale or frequency they have in the past. This reduces the scope of the Site Operation and Planning Manager role, which we recommend moving under the

direct oversight of the Landfill Operations Manager, rather than directly reporting to the SWRD Director;

- At the time of our on-site visit, the CDL currently had a staff of 15, with 11 frontline employees being overseen by 4 management level employees. To bring staffing closer to industry standards, we recommend that the Landfill Manager position be dissolved;
- We recommend that the Solid Waste Support Supervisor that is currently under the Site Operation and Planning Manager, instead report to the Administration Manager.

Introduction

In February 2018, Blue Ridge Services, Inc. (BRS) was contracted by the City of Denton (City) to perform an operations review and staffing assessment of the City of Denton Solid Waste and Recycling Department (SWRD). This project was to include a review and assessment for the City landfill and collections operations.

The project began with BRS requesting relevant and recent site-specific data and information. This information was requested in the form of comprehensive landfill and collections questionnaires, and the results were researched and provided by SWRD staff. These questionnaires addressed operational and safety issues regarding staffing, equipment, schedules, route information, landfill, customer service, and administration. Additional documents and data were also obtained throughout the course of the project, including historical accident reports, tonnage, and a number of other relevant operational and safety program documents and data.

From March 26-March 30, 2018 BRS team members Neal Bolton, Ron Proto, and Kasem Cornelius travelled to Denton for an on-site visit of the SWRD. Our team spent 96 hours on-site observing landfill and collections operations, interviewing staff, collecting photos and video, and identifying specific areas for operations and staffing improvements. In addition, our team made visits to the Pratt recycling facility, fleet maintenance facility, and to the Customer Service Department. BRS's time onsite led to a thorough assessment of all elements of the SWRD.

Our primary goals for this project were to identify opportunities for SWRD to effectively utilize staff, increase operational efficiency, reduce costs, maximize landfill life, improve customer service, and enhance safety throughout the landfill and collections operations.

During the evaluation, we closely examined key aspects of SWRD operations, with most of our focus on the waste-handling operation – as that is where the bulk of the staffing, resources and money are spent at the facility. It should be noted that the focus of the assessment was to look for inefficiencies or areas within the operation that could be improved. The following report identifies areas or specific activities where improvements can be made. And in doing so, it addresses a wide range of operational issues – many of which are inter-related. Thus, in order to properly understand individual findings, it is necessary for the reader to see how each one fits into the whole. So, we strongly recommend that the entire report be read before taking a position based on a single issue.

Finally, despite the areas within SWRD operation where we identified room for improvement – which was in fact what we were looking for – it should also be noted that

there were many tasks being performed correctly and efficiently. It is with pleasure that we present this report in that context.

Department Overview & Background

The following sections provide a brief overview of the environment in which SWRD operates.

Location

Denton, Texas is located in the northern portion of the Dallas-Fort Worth Metroplex, approximately 40 miles North of Dallas and Fort Worth. According to the 2010 United States Census, Denton had a population of 113,833. Since 2010 the city has seen rapid population growth, resulting in an estimated 2016 population of 133,808. New commercial and residential developments have led to increased solid waste tonnage generated within the city and required the addition of SWRD collections. Due to the multiple universities in Denton, the population experiences some annual fluctuations based on school breaks, and solid waste generation typically increases in the weeks that students move in/move out.

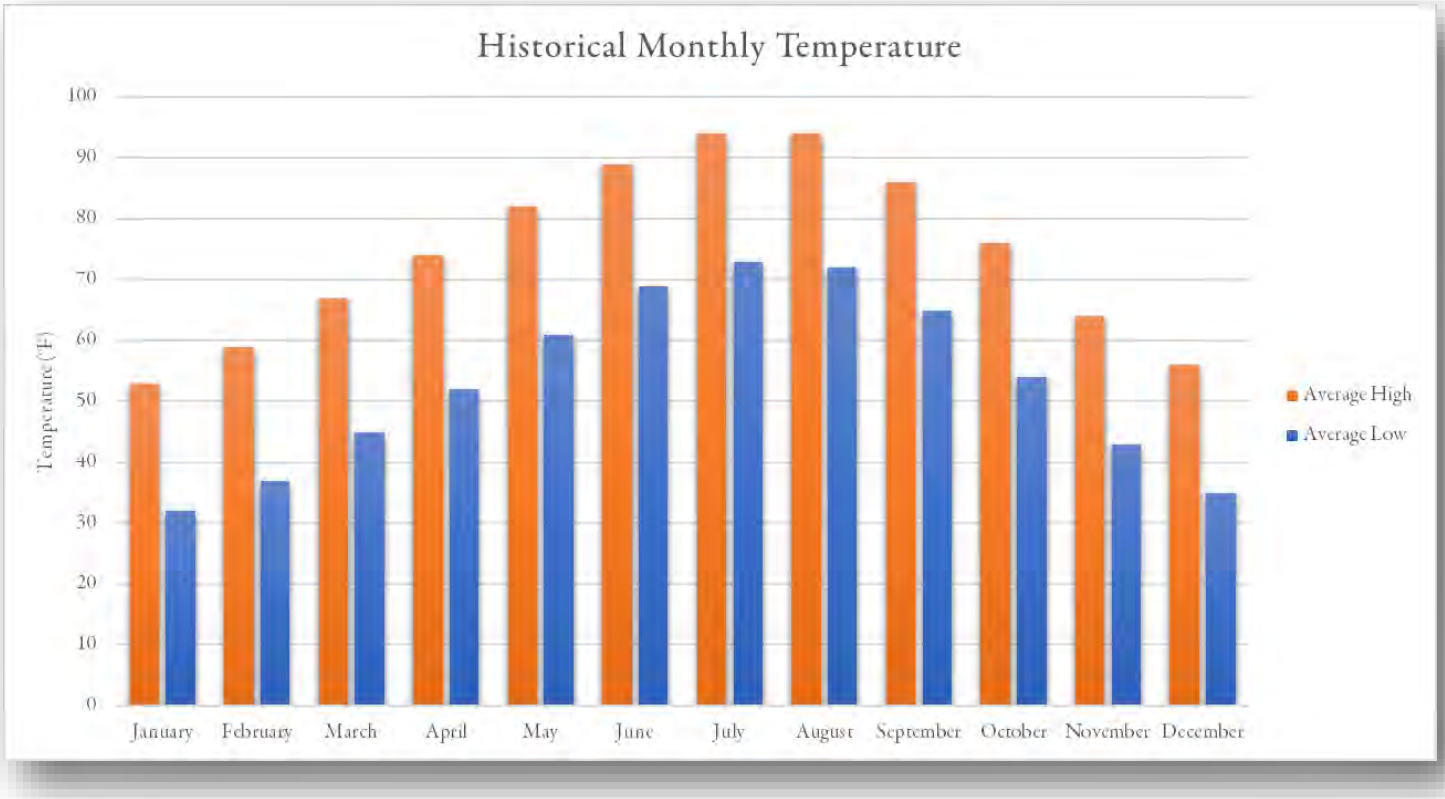
Historical Climate Data

The weather data utilized for the following sections was collected from the National Oceanic and Atmospheric Administration (NOAA).

Temperature

The average monthly high and low temperatures for Denton are shown in the following chart (based on data from 1914-2017). This information is useful in understanding any weather related, operational restrictions. The data indicates that there are 2 months with average high temperatures in excess of 90 degrees. These sustained high temperatures present some challenges with maintaining adequate dust control measures and can cause equipment to overheat if not properly and regularly maintained. The average yearly temperature at CDL is 64°F, which is 16% higher than the national average (55°F) but 7% lower than the Texas average (69°F).

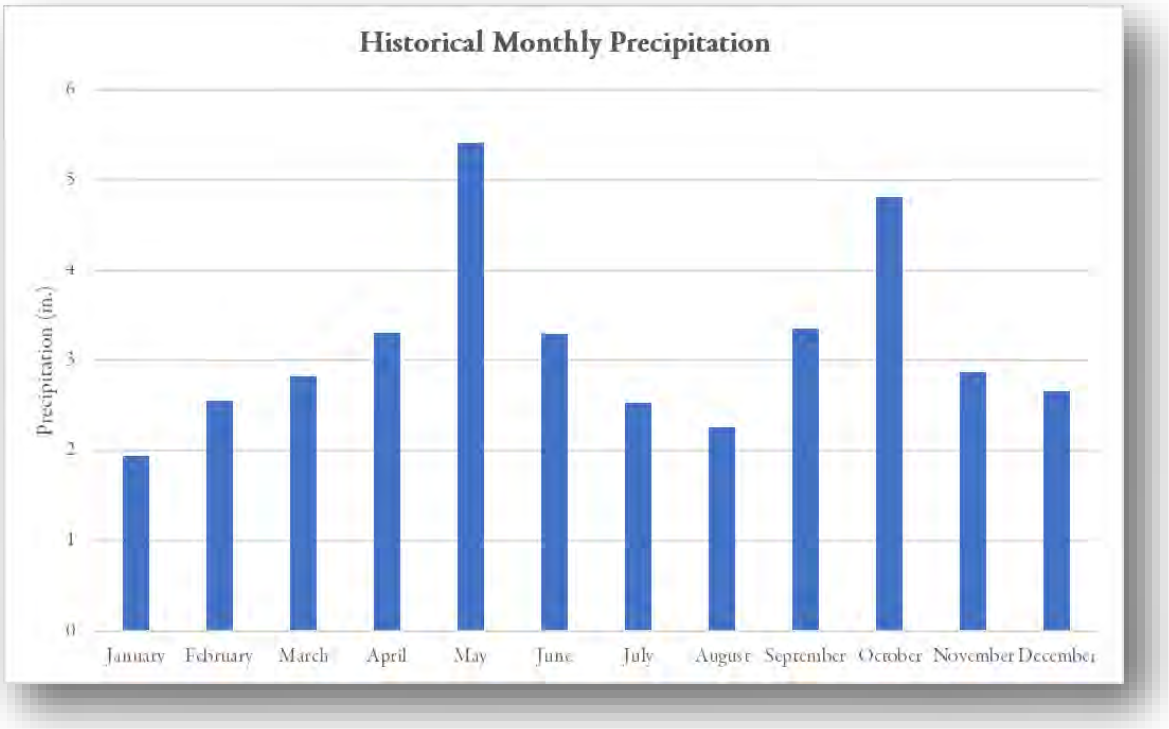
We recommend that one of the key performance metrics for heavy equipment at the landfill be to regularly monitor machine temperature through VisionLink™ where applicable (for Cat equipment) or through other remote monitoring systems for non-Cat equipment.



Precipitation

The average monthly precipitation for Denton is shown in the following chart (based on data from 1914-2017). Denton has a humid subtropical climate that is characteristic of the southern United States. The heaviest rainfall occurs during May and October, with May being the wettest month. The area averages 38 inches of precipitation per year, which is just under the national average (39 inches). Denton can also experience volatile weather, with significant weather variations in a short period of time, even within a single day – typically as related to regional or localized storm cells (i.e., thunder storms). This means operations must be prepared for unexpected changes in weather. When considering the average, the annual rainfall may occasionally lead to operational challenges, including excessive leachate generation, drainage issues, and vehicle and equipment access problems.

This highlights one of the primary goals of having a comprehensive Fill Sequence Plan: to pre-plan and construct adequate all-weather access roads for landfill customers. This also requires strategic pre-placement of adequate quantities of rubble in appropriate locations. Stormwater control – especially on the recently-constructed new liner – can help reduce the quantity of leachate created by aggressively working to keep clean stormwater separated from contact water and leachate.



Findings & Recommendations

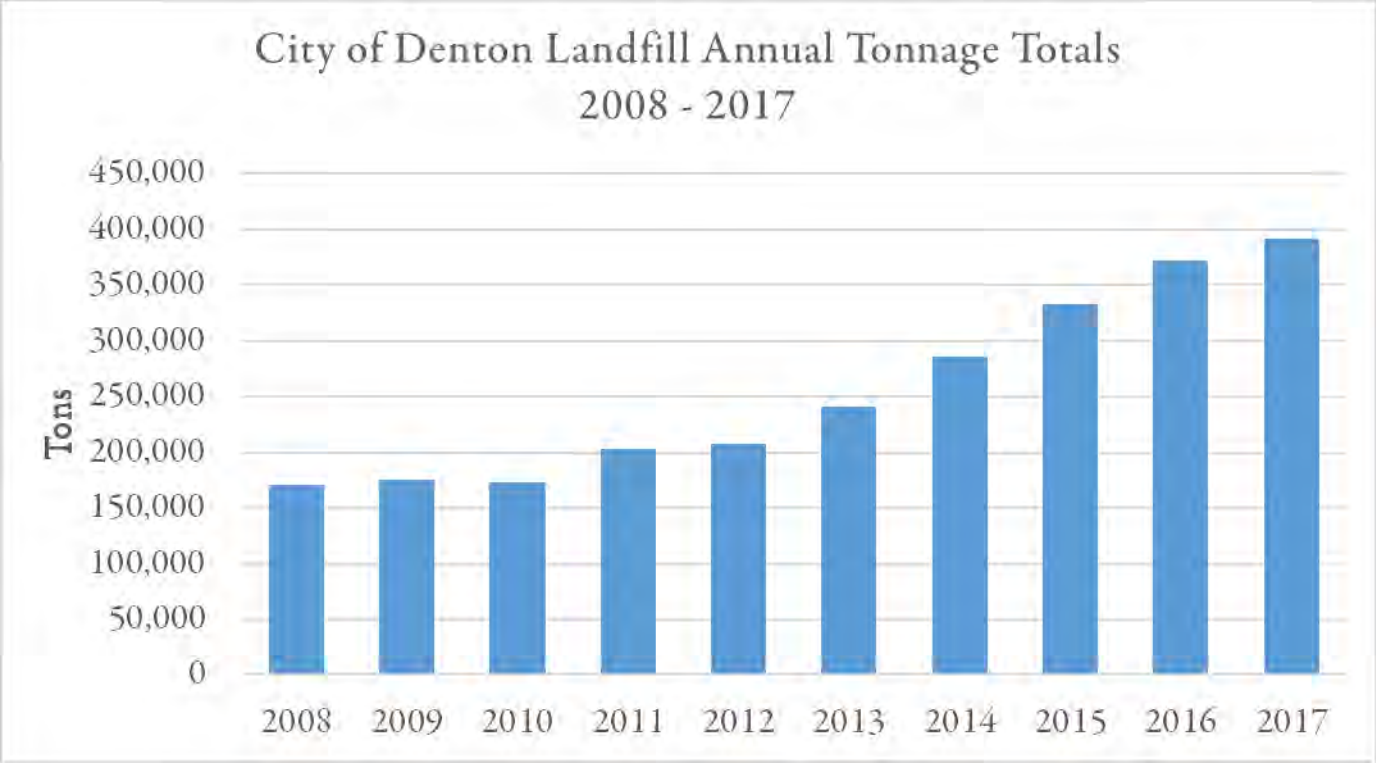
Our findings and recommendations have been split into the following sections:

- Recommendations related to the landfill site and operations
- Recommendations related to collections operations
- Recommendations related to the entire SWRD (both landfill and collections)

Due to the broad scope of this review, comprehensive analysis was not performed on every individual aspect of the SWRD. Instead, we used information gained through the questionnaires, data requests, and on-site visit to determine the specific areas for analytical focus in which operations and staffing could see the greatest improvement.

Landfill

The City of Denton Landfill (CDL) accepts solid waste from City of Denton Collections (CDC), public residents of the city, and private haulers. In the past 10 years, landfill tonnage has seen substantial growth, from accepting a total 170,972 tons in calendar year 2008 (averaging 541 tons per day), to 392,098 in calendar year 2017 (averaging 1,240 tons per day).



This increased tonnage has seen a corresponding growth in landfill revenue from tipping fees collected at the scales. Total scale revenue has grown from about $5.5 million in 2008 to $10.75 million in 2017.

In addition to growth of the traditional landfill operation, SWRD has instituted multiple ancillary operations at the landfill, including:

- Building Material Recovery (BMR)
- Rubble Processing
- Enhanced Leachate Recirculation (ELR)

In our experience at hundreds of waste facilities, we have found that in times of rapid growth and addition of ancillary activities, foundational inefficiency within the landfill's operations can occur. These inefficiencies often involve excessive staffing and overuse of heavy equipment (i.e., high utilization rates), and a lack of overall operations planning. We sometimes find that ancillary facilities and site infrastructure are over-built. These

types of problems are simply the too-common result of having lots of available revenue and losing sight of sound business practices in regard to revenue v. cost.

The following sections discuss key areas we identified for operational improvement at the CDL.

Landfill Operations Planning

On-site observations and interviews indicate that landfill planning is not happening to the extent it should. This is evidenced in long-term planning with the placement of soil stockpiles in areas that are not readily accessible, portions of the soil stockpile overlaying (piggyback) on previously screened concrete/asphalt rubble, and inadequate planning to provide uninterrupted wet-weather access for waste vehicles.

While the CDL has a Site Layout Plan that address cell boundaries and overall site layout, the actual day-to-day operations planning of constructing the landfill and handling material currently is not happening. BRS asked landfill supervisors and operators how cells are constructed, where the face will be in the coming weeks/months, and other site development questions. It was clear that while supervisors may have an idea in their heads, there is currently not a documented, nor optimized, plan for landfill development.

By planning ahead for both long-term and short-term operations, significant savings and efficiency improvements are possible. These will result in immediate benefits in operations and down-the-road benefits in the form of landfill airspace utilization. BRS recommends that the following be developed for the CDL:

- Soil Management Plan
- Fill Sequence Plan
- Wet Weather Preparation Plan

Soil Management Plan

A practical and efficient Soil Management Plan (SMP) takes the typical broad and generalized sequencing of long-term landfill site development and converts it to a financially-optimized development plan. Like a chess player planning moves ahead, an SMP will identify the most efficient and cost-effective way to manage soil excavation, transport and stockpiling, liner development, closure sequencing – and all major capital (construction) projects that will be required throughout the remaining life of the landfill.

During preparation of the SMP, many different scenarios are considered, along with the expected timeline and related cost. In most cases, the timing of specific capital expenditures such as liners, final cap, large-scale excavation, is based on the rate of consumption for landfill airspace.

While an SMP would include operational improvements to slow the consumption of landfill airspace, it would also be looking at the most effective ways to increase compaction and reduce cover soil usage. An SMP all also be looking for ways to defer the most expensive projects for the longest period of time.

An SMP is all about strategic planning the development of the landfill – to minimize the actual net-present cost. Once the volumes and other cost-related data has been compiled, creation of a practical SMP effectively becomes a matter of looking at various development options under a "What If" scenarios.

Upon completion of an SMP, the landfill will have an excavation/development plan that will maximize the existing on-site soil, minimize double-handling, and push future capital costs (i.e., liner construction, closure, etc.) as far into the future as is practically possible – generally through the entire life of the landfill. This approach – of creating a SMP – is cost-effective because it helps streamline the operation. will prove cost-effective by maximizing air space. It will also allow the landfill to take advantage of potential settlement by strategically placing soil stockpiles on top of existing waste.

Finally, this SMP information, along with the major cost items associated with all activities, should be plotted on a timeline so that the timing of major events, remaining capacity, and associated cash flow can be evaluated. This should include the calculating of the Net Present Value (NPV) for all future costs.

Based on economic analysis and adjusted to match other requirements (i.e., is it practical and buildable?), the CDL will be able to identify the most efficient, practical, and cost-effective scenario. We recommend that the CDL develop an SMP that will identify the optimum development scenario for the landfill, while presenting it in a practical format that supervisors and the landfill team can easily understand and follow.

In essence, the SMP becomes the goal, toward which the Annual Fill Sequence Plan moves.

Annual Fill Sequence Plan

An Annual Fill Sequence Plan (FSP) is an engineering drawing that provides step-by-step guidance for filling the landfill. Compared to the SMP, an FSP is relatively short-term: generally covering a period of 12-18 months. An effective FSP addresses the following:

- Are storm water controls adequate and properly located?
- Where will the next wet-weather tipping pad be located?
- How long will the current lined area last and are we fully utilizing the existing fill capacity?
- Are the short-term access roads, stockpiles and haul roads in the best locations?

- Are there problems with the current topography in regard to drainage, erosion, or infiltration …and how will they be corrected?
- How can the next 12-18 months of filling most effectively work toward the overall development of the landfill?

The FSP provides answers to these and other questions. However, it more than just show an arbitrary sequence of filling - it shows an "optimized" operation. Optimizing the landfill's FSP ensure that the overall operation is as productive and cost-effective as possible. An optimized sequence plan also provide the basis for annual budgeting and scheduling. Quantifying and ensuring adequate filling capacity - especially during wet weather – should be included as well.

Wet Weather Tipping Pad

Denton received 1.74 inches of rain in a single day during our on-site visit. This made for a very muddy, messy, and unsafe operation at the tipping face. We witnessed multiple trucks become stuck in the mud, and require the bulldozer to pull them out. In speaking to landfill employees as well as regular customers, the perspective was that this type of operation is normal when it rains, and there wasn't much to be done about it.

We recommend that the CDL follow the industry standard best management practice (BMP) for wet weather landfill operations and construct a wet-weather tipping pad. A wet-weather tipping pad is a designated tipping and access road constructed for all-weather access and constructed with unprocessed rubble and may be topped with aggregate. The intent is that these roads/pads will be used only during wet conditions. During dry periods, filling would occur on areas accessible via unsurfaced roads/pads. Wet-weather tipping pads often increase customer and employee safety as well as improve operations.

In order to minimize the cost of constructing these all-weather roads and tipping pads, their location should be pre-determined in the FSP. With this pre-planning, customers can be instructed to unload rock and rubble at the desired wet-weather tipping pad location throughout the year. This allows this material to be collected and stockpiled where it will be needed and allow CDL to avoid the cost of loading and transporting it.

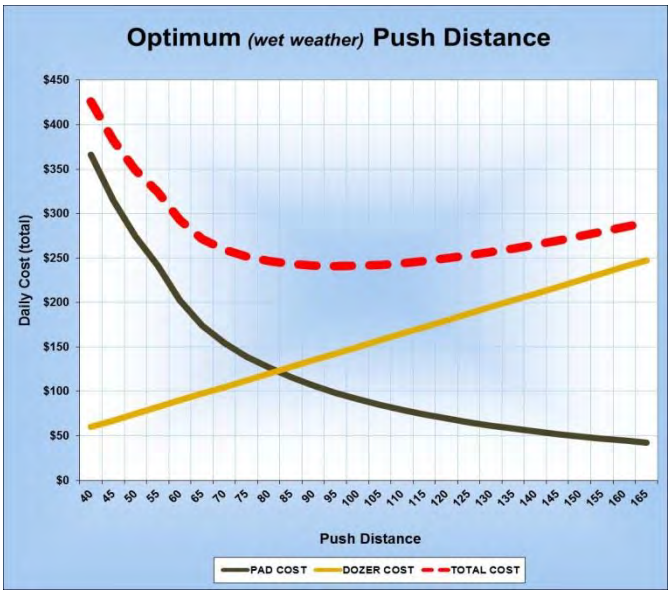
For more information on how a wet-weather tipping pad would fit into current landfill operations, see the following ***Rubble Processing*** section.

Examples of Planning "Optimization"

The following are examples of how an SMP and FSP not only help plan the future of the landfill but can be used to optimize the operation by increasing efficiency, reducing costs, and improving safety.

Push Distance Optimization

At the CDL, waste is pushed from where it is dumped (by garbage trucks) to the active tipping face. When working from a wet weather tipping pad, this process creates two conflicting costs.



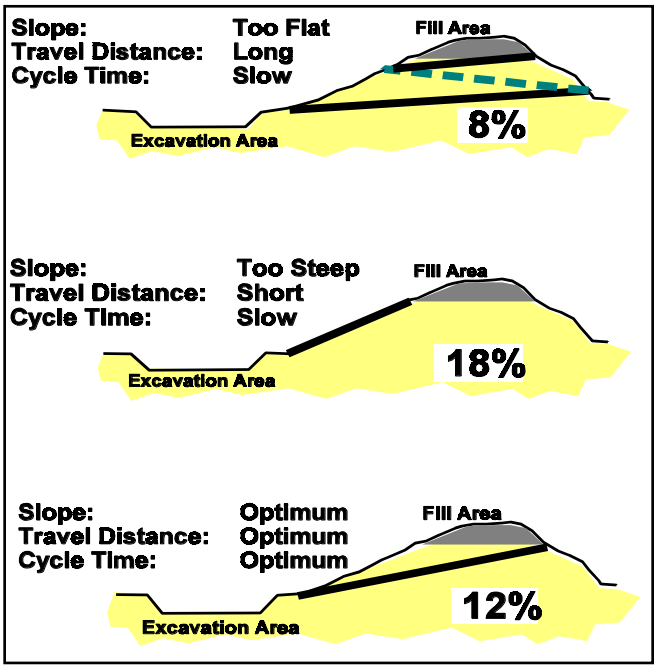
Here is an example of optimized push distance. The brown line shows the all-weather pad cost per day – indicating that the further you are willing to push the trash from the tipping pad, the longer that particular pad will last. This allows the cost of that pad to be amortized over a longer period of time. In essence, the cost decreases with distance – it becomes asymptotic (i.e., approaches zero).

The yellow line shows the dozer cost. The dozer cost is obviously directly proportional to push distance, the further the push, the more dozer hours required (and so the cost increases). This is a linear function.

Finally, the red line shows the combined costs of the two parameters. The low point in the red line is the "optimized" point, where the two opposing costs (pad and dozer) are minimized. This low point corresponds to the optimum push distance.

Haul Road Slope Optimization

The longitudinal slope of the haul roads used by scrapers or articulated trucks (i.e., soil haulers) is normally set to minimize cost (...which also maximizes efficiency). This process is again, a balancing act between flatter slopes – which allow vehicles to move quickly but not rapidly gain elevation, and steep slopes – that gain elevation quicker ...but reduce vehicle speed. Effective planning would evaluate specific productivity curves for the CDL fleet of articulated haul trucks in order to determine the optimum slope – seeking the slope that allows these vehicles to be most efficient.



This type of analysis would be included in a SMP, where future phasing of the landfill is evaluated.

During our time on-site, we observed soil being hauled to the active face, using the same access road(s) as the waste vehicles. And, while this is clearly an excellent haul road, it is not safe for waste vehicles. We strongly recommend that heavy equipment (i.e., articulated haul trucks) not be allowed to operate on the same roads used for waste vehicles. Additionally, these haul trucks cause damage and increased road maintenance by dropping a lot of dirt/mud on the haul road. In future planning, dedicated haul roads should be designed/constructed for heavy equipment.

In regard to daily operations, we suggest the landfill adopt two (2) important changes: Pancake Cell Construction (PCC) and a Typewriter Tipping Pattern (TTP). These are explained below:

Pancake Cell Construction

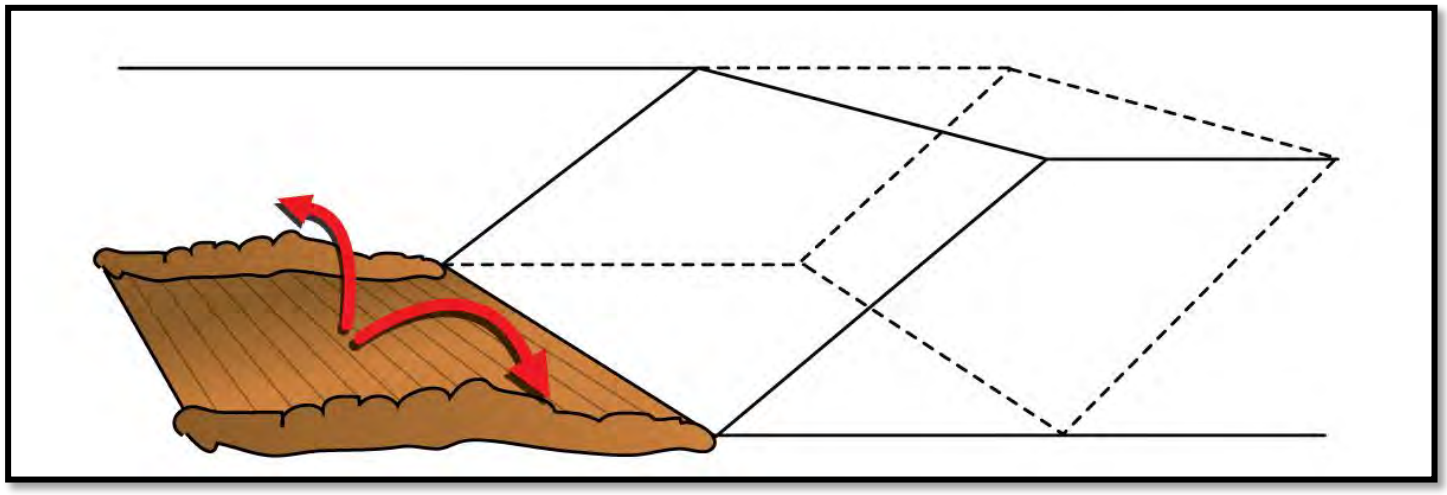
We suggest the CDL staff transition from their historic advancing face cell construction technique to a horizontal "Pancake" cell construction (PCC) method. We offer the following information and background relating to pancake cell construction.

Selecting the best overall kind of cell construction can be a complex task. Many of the major factors are inter-related. For example, in order to minimize the use of intermediate cover soil (on each lift of trash), a very thick lift would be preferable. However, a thick lift, when combined with uphill pushing results in the dozers having to work much harder. Similarly, a steep working face will minimize the amount of ADC required, but will also slow the compactors, thus resulting in decreased density. In the following sections, we will present what we believe are the most significant issues related to horizontal cell construction.

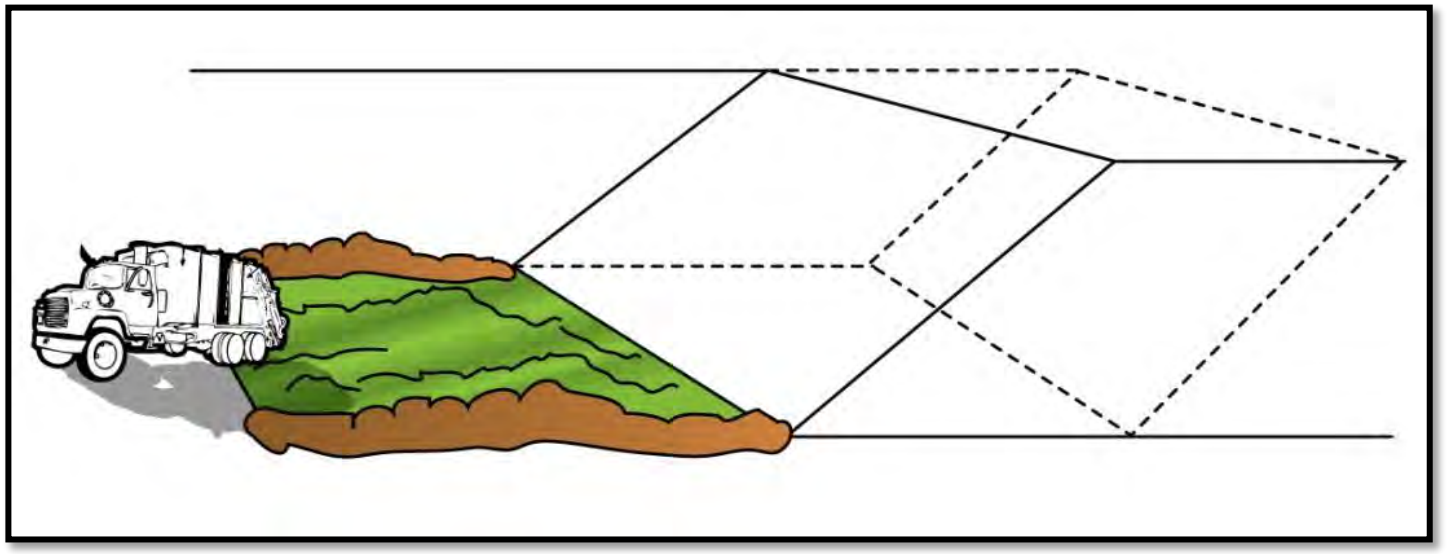
The first issue is related purely to geometry, and the fact that a small daily cell will require a higher percentage of cover soil than a large cell. As cell size increases, the surface area increases as a squared function (i.e., length x width), whereas the volume increases as a cubed function (i.e., length x width x depth).

So, in order to take maximum advantage of this economy of scale, we recommended that CDL begin constructing what are, in essence, weekly cells. Thus, instead of building and covering daily cells, the interval of placing cover soil is deferred to once every week.

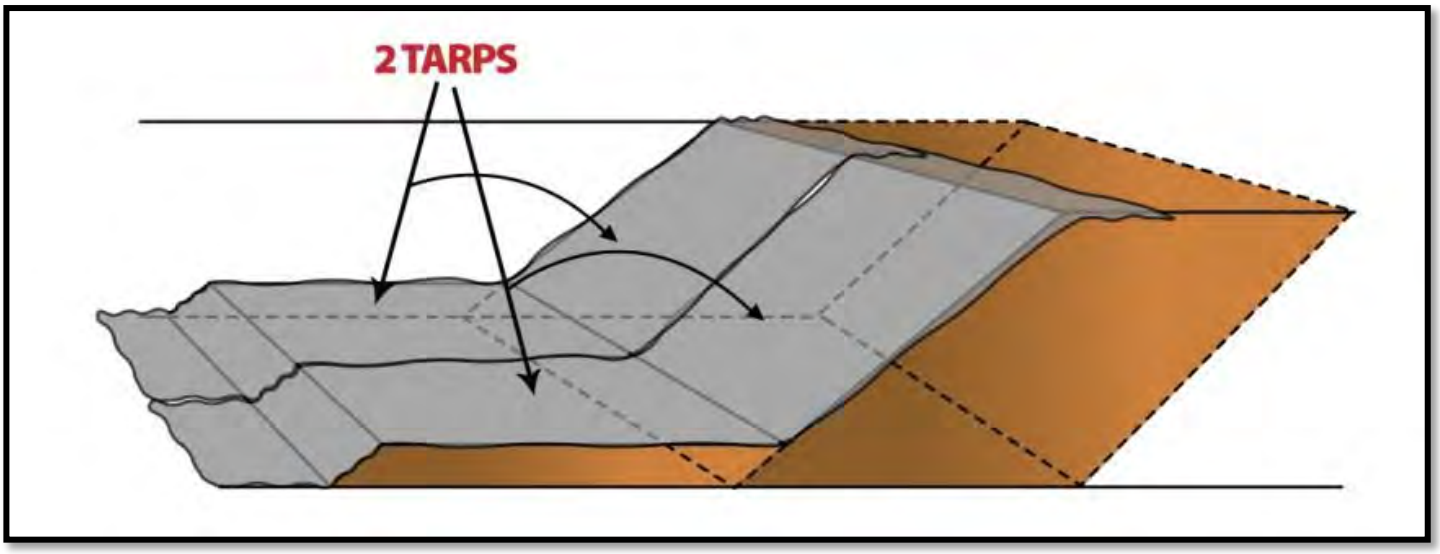
At the beginning of the next stack, previously-placed soil should be stripped for the next footprint (pictured). The stripped soil should be stockpiled at the side of the cell for re-use. This salvaged soil can be used to fill initial voids prior to using clean cover soil. Additionally, pre-fill stripping tends to minimize leachate seeping issues and can also improve landfill gas flow.



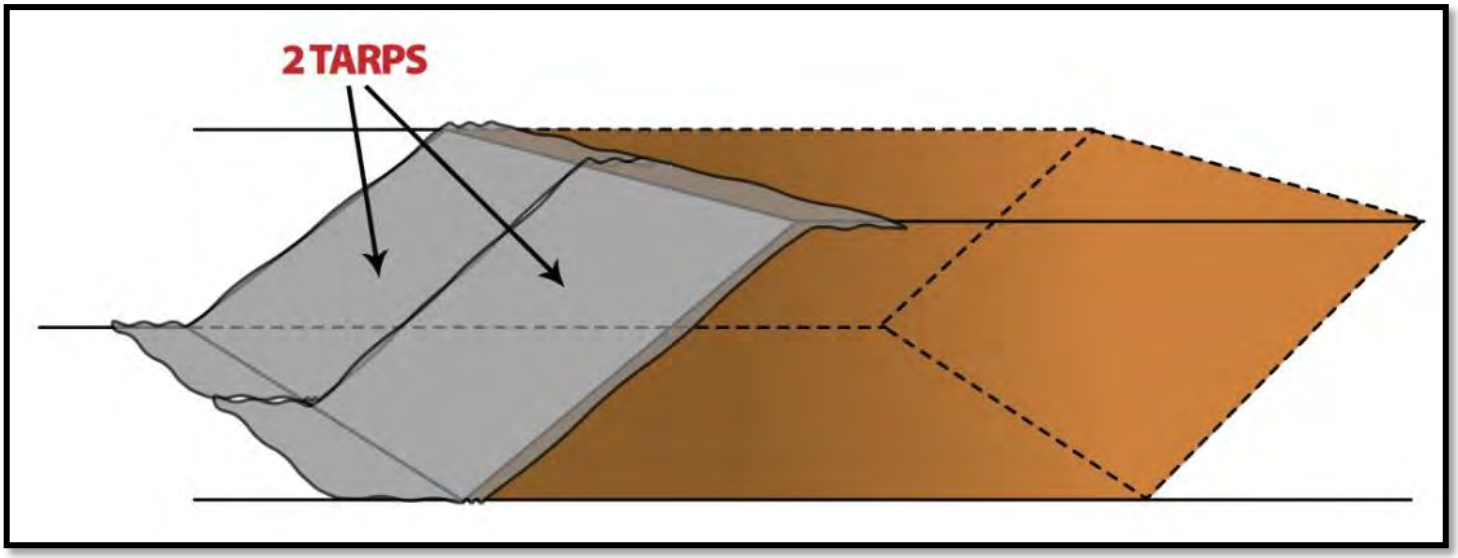
Waste would then be spread horizontally across the stripped area and compacted.



At the end of the day, the waste is covered with tarps. Only the side slope receives cover soil green waste, salvaged soil or other suitable material. This graphic shows 2 tarps, however, depending on many factors, we expect many more tarps would be required at the CDL.



Each day, the tarp is removed, and more waste is placed. Once the stack reaches grade, the entire process is repeated at an adjacent location.



At the end, the stack of pancakes would be covered with soil, and the face would be covered with a tarp. The next day, the entire process would be repeated. Please note: the completion of the stack does not have to occur on any specific day …or on any set time of day. It is simply completed when the stack reaches grade – and if it doesn't reach grade or isn't ready to receive cover soil by the end of the day it is simply re-tarped.

By changing the way waste cells have historically been constructed, and by minimizing the quantity of soil used for daily cover, we believe the CDL can continue to extend its life and save a significant quantity of soil. And, as the CDL staff refines these practices, we expect to see the landfill operation become more efficient and consistent.

Obviously, adopting the PCC will require a more diligent use of the mechanical tarping unit – and the purchase of additional tarps.

Typewriter Tipping Pattern

While onsite, the pattern for how commercial vehicles dumped at the active tipping area was inconsistent and undefined at times. This inconsistent tipping pattern created some inefficiencies, confusion, liabilities, and potential safety issues. In conjunction with the recommended *Spotter* practices, we encourage the CDL to fully and consistently implement a "Typewriter" Tipping Pattern (TTP).

A TTP requires that once a commercial tipping row is started, the adjacent slots are occupied and eventually cleared by the bulldozer in a consistent and logical manner (either left to right or right to left). Tipping out of sequence is discouraged as this minimizes the predictability and intent of the pattern. Using the appropriate amount of tipping slots discussed within the *Landfill Production Analysis* and *Optimum Cell Geometry* sections of this report will further minimize the congestion, chaos and safety issues traditionally encountered during peak tonnage periods.

The TTP has additional benefits: First it allows the customers, spotter and equipment operators to all know where the next load is going to be spotted. By maintaining a minimum 2 slot buffer, the pattern allows customers to remain a safe distance from the bulldozer as it clears the tipping pad and integrates waste into the cell. This safety buffer also prevents the bulldozer from having to sneak in between two trucks to hastily push the loads to make room for the next inbound customer. The standardized pattern allows uniform practices from one staff member to the next, minimizing confusion and inconsistent practices.

We have provided a series of illustrations in *Appendix C.* describing the basic TTP fundamentals.

Along with implementing a TTP, we also suggest that a spotter's station be installed at the tipping pad. This is an important step in helping truck drivers become familiar with the TTP, it also minimizes potential risk to the spotter.

Spotter Station

The landfill tipping pad is typically one of the most hazardous areas at a landfill. Based on our observations, we feel that the CDL staff needs to improve safety at the tipping pad. At times we observed some confusion at the tipping pad in regard to where/when the next truck should dump. We suggest this be remedied through clearly defined procedures and additional operations training. Of utmost importance, we recommend that the CDL consider utilizing a portable spotter's station (pictured).

Safety is of utmost concern when placing a spotter on a busy landfill tipping floor. When used in conjunction with the *Typewriter Tipping Pattern* a dedicated portable spotter station is an excellent method a safely and effectively spotting customer loads. The intent of this station is for the spotters to greet the customers, check loads and provide general customer direction while keeping the spotters confined and safe. The direction provided by the spotter should be in relation to which "slot" the customer should utilize. It is important that the spotters do not assume too much liability by providing excessive direction. For example, if a spotter is directing a customer and the customer backs into another vehicle, the spotter could potentially be liable.

We recommend that the spotters stay in the spotter's station as frequently as possible. We do not encourage spotters to direct traffic from the potentially dangerous tipping floor. If the spotter station is positioned properly, a spotter can adequately provide customer direction while viewing all that is taking place at the tipping area.

Rubble Processing

The rubble material the landfill receives consists of broken concrete, asphalt, and bricks. The rubble data used through this section is drawn from the Concrete Receipt & Crushed Concrete Sales Analysis (dated 3/19/18) that BRS received from SWRD while on-site.

The following chart indicates that rubble material is routinely being brought in at approximately half the listed gate rate. The average gate revenue received for all rubble material in fiscal years 2015-2017 was $3.02/ton.

Fiscal Years 2015-2017 Rubble Listed Gate Rate vs. Average Gate Revenue		
	Listed Gate Rate $/ton	**Average Gate Revenue $/ton**
Concrete	$8.00	$3.37
Asphalt	$8.00	$3.39
Brick	$2.00	$0.01
Average Total Rubble	$6.00	$3.02

Rubble material brought to the landfill is currently stockpiled for processing by the CDL or an outside contractor (Big City). This material has historically been processed into aggregate base material, and stockpiled elsewhere on-site for sales to customers, or used as landfill road base, or placement at the tipping face during wet weather.

While this processed aggregate base material is useful for well-manicured roads and may have increased outside sales potential, it is not effective road base for landfill access roads or wet weather tipping pads. In the landfill setting, with heavy trucks and equipment, this aggregate base material is easily pushed into the soil, especially in wet weather, providing little to none of the desired benefit.

We suggest that most of the concrete and asphalt rubble can be used as is (un-processed) for roads and tipping pads, because this type of material creates a stronger, much more durable road.

Some processed aggregate is being sold to customers. In the past 3 fiscal years (2015-2017) however, only about 10% of inbound concrete and asphalt was sold. This means that the majority of rubble material is currently:

1. Being brought across the scales at nearly half price (averaging $3.02/ton)
2. Handled by CDL equipment and placed in stockpiles
3. Processed by either CDL (averaging $5.04/ton) or by Big City (averaging $7.35/ton)
4. Handled by CDL equipment and placed in stockpiles
5. Roughly 10% of processed material handled by CDL equipment and sold to customers (averaging $8.66/ton)
6. Remaining 90% of processed material is either:
    a. Handled by CDL equipment and placed on roads and tipping pads for little to no benefit, and potentially taking up airspace (currently valued by SWRD at $6/cubic yard)
    b. Collecting in on-site stockpiles

As the following chart indicates, 205,474 tons of processed material has remained on-site in the last 3 years, and a combined loss of $387,039 has occurred due to the rubble processing operation. Of course, this "loss" is based on cost v. revenue and does not account for the benefit of the material that was used on-site. However, even though the CDL did receive some benefit from the processed material, the value to the landfill does not warrant the high cost of processing this material, because:

- The CDL may not have needed the full volume of aggregate that was produced. We suspect that it was used because it was available on-site;
- We also believe that processing the rubble into aggregate base adds significant cost to create a product that doesn't perform as well as the unprocessed material;

Rubble Processing Operation Fiscal Years 2015-2017		
	Tons	**Revenue/ Expenses**
Concrete, Asphalt, & Brick Tons Received	226,171	$683,116.00
Material Processed by Big City (Actual Expenses 2015-2017)	45,729	-$336,162.00
Material Processed by SWRD (Actual Expenses 2015-2017)	180,442	-$910,366.00
Crushed Concrete & Asphalt Sales	20,697	$176,373.00
Tons of Concrete & Asphalt Remaining On-Site (Processed & Not Sold)	**205,474**	
Concrete & Asphalt Income FY 2015-2017		**-$387,039.00**

Based on the ongoing financial losses, expensive specialized equipment required, and inefficient operations and staff utilization, we recommend that the SWRD:

1. As previously mentioned in this report, develop a detailed SMP and FSP that will identify the location of future tipping pad(s). Those pads be constructed a year or more prior to when they will be used. The inbound customers with *select* rubble would then be directed to the future tipping pad(s), thus eliminating the CDL's future cost of processing and transporting.
2. We estimate a wet-weather tipping pad and access road requiring roughly 3,380 tons of rubble annually
3. Discontinue processing rubble in-house. Most rubble can be used as-is for other on-site purposes, without further processing or taking up valuable airspace. This would allow the sale of all heavy equipment, grinders and screeners dedicated to this operation. Money received from these equipment sales should be set aside in CDL reserves for future equipment maintenance/purchases.
4. Contract Big City on an annual basis to process large pieces of concrete (thicker than 2 feet) or pieces with lots of protruding rebar. Big City would also process into fine aggregate only the amount of tonnage CDL forecasts selling in the coming fiscal year and needs on-site based on landfill planning.
    a. We estimate the amount of processed tonnage required will reduce to 10,000 tons per year or less.
5. Gate rates for all rubble materials should be increased and consistently charged. Detailed analysis and trials should be conducted to determine the price point that:
    a. Ensures that the CDL receives the rubble tonnage required for on-site uses and forecasted aggregate sales
    b. Reduces incoming tonnage that will end up stockpiled and unused
    c. Maximizes CDL profitability

NOTE ON BMR ANALYSIS:

One portion of the BMR is rubble processing, which has already been discussed in a previous section. The data received for the BMR operation overall included tonnages and values for rubble/aggregate material that was inconsistent with the data we received specifically for rubble processing. Inconsistencies included:

- Incoming tonnages and revenues
- Big City contracted expenses and tons processed
- Crushed concrete sold tonnage and revenue

Rather than forensically analyze and manipulate the data to reconcile these inconsistencies, we have conducted our analysis of these portions using the respective data sources SWRD provided.

Building Material Recovery

The Building Material Recovery (BMR) operation, established in November 2011, is meant to increase landfill airspace utilization and diversion of inbound construction and demolition material through sorting, shredding, reuse, and recycling of material.

Airspace

We believe the additional density gained by shredding the material at the BMR is not worth the effort or cost. Instead, by properly using the existing landfill equipment, the landfill could achieve in-place waste density that exceeds the current density rate… for much less cost. In our experience at many other landfills across North America, those that consistently achieve the highest in-place density, are doing so with traditional landfill compactors and an appropriate application of water/leachate. Applying leachate/water to the active face is something we suggest the landfill pursue (from a regulatory approval standpoint). From an operations perspective, it is a good practice and will yield better density, reduced litter and over the long term, a more consistent and uniform gas production than the ELR. As noted later in this report however, increasing gas production – through the application of water at the face or through the ELR, do not appear to be practical at this time. In any event, the BMR is simply not cost effective.

Staffing and Heavy Equipment Utilization

Staffing required for the BMR operation includes 2 supervisors and 5 heavy equipment operators. The BMR also currently requires multiple pieces of specialized and costly heavy equipment, including, but not limited to:

- CAT 973 Waste Handler ($548,231)
- Komatsu PC490 Excavator ($388,140)
- Powerscreen Sorting Table ($193,000)
- RotoChopper 900 HP High Speed Grinder ($770,900)
- Doppstadt DW3060k Slow Speed Shredder ($613,446)
- Volvo L180E Wheel Loader ($295,850)

While on-site we observed very poor utilization of both staff and equipment. Disposed material is being excessively handled with little to no added value with each touch. Observed examples include:

- Volvo L180E Wheel Loader picking up 10-20 lbs. of metal material at a time and loading into roll-off bin
- Skid steers picking up small metal items and loading into roll-off bin
- Cat 973 Waste Handler picking individual 8 to 10-foot lengths of material (pipes, wood, etc.)
- 10 to 12-person sorting table/pick-line being operated by 1 employee

- Magnetic lead separating metal that is contaminated from snagging carpet, foam, and other material in the grinding process.

Financial Viability

While the scope of this project does not include an in-depth feasibility analysis of the BMR, our on-site observations raised questions regarding the financial viability of the operation.

Gate fees for material processed at the BMR would not factor in determining the BMR's financial viability since the landfill would still be receiving that revenue if material was to be landfilled, and not processed through the BMR at all. The additional processing of material by BMR staff and equipment should prove financially viable through the combination of:

- Commodity sales revenue
- The value of lined-landfill airspace saved through diversion and consolidation of processed solid waste material

Using the BMR proformas available, we compared these BMR revenue/value streams to operating expenses for Fiscal Year (FY) 2015 and 2017.

BMR Financial Viability FY 2015 & 2017		
	2015	2017
Commodity Sales Revenue	$175,785.00	$314,926.00
Reported Airspace Savings Value on BMR Pro Forma	$436,138.00	$453,565.00
Reported BMR Revenue	$611,923.00	$768,491.00
BMR Operating Expenses	$1,096,604.00	$1,119,336.00
BMR Income	**-$484,681.00**	**-$350,845.00**

Commodity sales revenue in both years covers less than half of operating expenses, leaving the remaining expenses to be funded through the value of airspace savings. To cover operating expenses, the BMR needed to reduce airspace consumption by an additional 80,780 cy in FY 2015, and 58,474 cy in FY 2017 (at the SWRD calculated airspace value of $6/cy). Instead of generating profit, the BMR operation caused a combined loss of over $800,000 in these two years alone.

We believe that actual losses are even greater however. We utilized data and values provided by SWRD in the above calculations, but in reviewing these proformas, we found issues with the method of calculating diverted materials.

BMR material stockpiled or placed within the landfill footprint should not count as diverted material, as is currently the case. Even if the material is intended for beneficial use, it is still consuming landfill airspace. Only the following pro forma categories should count toward diversion:

- Mixed C&D
  - Tires
  - Cardboard (OCC)
  - Electronics Sales (ECS)
  - Metal Sales
- Wood Loads
  - Processed Wood to Compost Operations
  - Wood Chip Public Sales
- Concrete & Asphalt
  - Road Base – Reduced Rate Material
  - Crushed Concrete Public Sales

An accurate accounting of diverted material would drastically decrease the value of airspace savings reported on current proformas, resulting in greater losses than those previously indicated.

Recommendations

The BMR data presented throughout this section, along with our experience at other solid waste facilities with similar operations, lends to the conclusion that the BMR is not financially viable.

Based on our observations of ongoing financial losses, expensive specialized equipment required, operational inefficiencies, poor utilization of staff, as well as the current recycling commodity markets, we recommend that SWRD:

1. Discontinue BMR operations.
2. Sell all heavy equipment, grinders, screeners, etc. dedicated to the BMR. The money received from these equipment sales should be set aside in SWRD reserves for future equipment maintenance/purchases.
3. Refocus efforts to increase airspace utilization on improving landfill compaction and soil usage. Landfill life expectancy and operational efficiency can be increased to a far greater degree using these methods than grinding material for size reduction.

The current BMR operation does provide an unloading area for self-haul vehicles. So, while we are recommending that the BMR operation be halted, there may be some benefit to having self-haul vehicles dump in that same area (as opposed to dumping at the landfill

face.) However, this will increase operating costs. As an alternative, we suggest that the fill sequence planning provide for a safe unloading area (for self-haul vehicles) adjacent to the tipping pad

Enhanced Leachate Recirculation System

The Enhanced Leachate Recirculation (ELR) system pumps collected leachate back through the landfill. The goal of the ELR system is to:

- Generate more LFG to increase the amount of power produced by LFG-to-energy system
- Extend the life expectancy of the landfill by increasing the rate of landfill settlement to provide additional available airspace

We will address each of these goals individually in the following sections.

Landfill Gas Generation

In 2004 SWRD entered a 20-year landfill gas (LFG) contract with DTE Biomass Energy (DTE). This contract includes the following responsibilities for each party:

SWRD Responsibilities	DTE Responsibilities
• Provide DTE exclusive rights to LFG • Pay capital cost of LFG collection system, extraction wells, & flare	• Build, maintain, manage, and monitor generating station and gas collection system • Pay City of Denton 12.5% royalty of gross power sales

We believe that the current gas migration issue is being exacerbated by the addition of leachate into the landfill's waste mass. A problem that cannot – under the current gas system contract – be mitigated. From that perspective alone, we suggest the ELR process be discontinued for the time being.

If/when control of the gas collection system comes under the full control of the landfill, they the ELR may make sense – for two reasons. There may be revenue gained from the sale/use of landfill gas – and the increased settlement produced by injecting leachate will help extend landfill life.

Landfill Life Expectancy

While the ELR system may increase the speed at which landfill settlement occurs, the total settlement of solid waste material will ultimately be of negligible difference. We believe the SWRD's goal of extending landfill life expectancy can be achieved more effectively through improved operational techniques. There are a number of operational aspects of the landfill that are currently not performing at the level of industry best management practice. Making the needed operational improvements would greatly increase airspace utilization and extend the landfill's life.

Two key areas of focus should be soil usage and compaction. Landfill airspace utilization data we were provided by SWRD, indicated that the landfill's effective density (pounds of waste per cubic yard of airspace consumed) for FY 2017 was 1,100 pounds/cy. We believe there is room for significant improvement. Solid waste industry best management practices average between 1,500 and 1,600 pounds/cy.

If the landfill had been operating at this level for the last 10 years, there would currently be an additional 1.2 million cy of airspace available. At industry standard densities, CDL could automatically begin saving over 100,000 cy of airspace annually, quickly adding years onto the landfill's life expectancy.

Recommendations

We see no significant value being added to the landfill by the ELR operation. As highlighted in the previous sections:

- The CDL is currently having LFG migration issues, and has no need for the additional LFG generated through ELR
- Bringing landfill operations up to industry best management practices will have a greater impact on airspace utilization and landfill life expectancy than ELR – but in the future, ELR may actually help to further improve the landfill's performance

With these points in mind, we recommend that SWRD:

1. Decrease/discontinue ELR operations
2. Prioritize improving airspace utilization by implementing industry best management practices, such as:
    a. Minimizing soil usage through:
        i. Alternative daily cover
        ii. Tarps
        iii. Improved cell geometry and construction techniques
        iv. Soil salvage
        v. Improved cover preparation and placement techniques
        vi. Landfill planning
    b. Improve waste density/compaction through:
        i. Proper compactor wheels/teeth
        ii. Flat compaction
        iii. Improved compactor operation techniques
        iv. Improve compactive effort

Equipment

Our operations review included an assessment of equipment utilized at the landfill.

Ancillary Equipment

As mentioned in the preceding sections, we believe a number of ancillary landfill activities should be discontinued or reduced. We also found a number of redundant or under-utilized pieces of equipment that can also be sold at auction.

We recommend that SWRD:

- Sell equipment dedicated to the BMR and Rubble Processing operations. The money received from these equipment sales should be set aside in SWRD reserves for future equipment maintenance/purchases.
- Assess all other equipment for utilization and redundancy

Landfill Heavy Equipment

In the process of evaluating the landfill operation, we considered the current equipment fleet compared to inbound waste tonnage. Using our experience at hundreds of other landfills as point of reference, we concluded that some change is in order. These changes include the following:

Primary Landfill Dozer (Komatsu D155): This machine is properly sized to handle the inbound waste stream. However, we believe it is being over-utilized. It appears that this machine logged approximately 2,730 hours last year. We believe that by changing the layout of the tipping pad to a typewriter dumping pattern, the dozer's working hours could be reduced by more than 50%, to approximately 1,300 hours per year.

Landfill Compactor (Caterpillar 826K): The CDL currently utilizes two Caterpillar 826K compactors. These machines worked a combined total of approximately 4,300 hours last year. Based on density tests we have performed at other landfills – and on our experience across the industry – we believe that these machines should actually be working a combined total of 5,600 hours per year. This is based on the optimum waste density being achieved when an 826k handles approximately 70 tons of waste per hour.

More importantly, these compactors are too small for the inbound tonnage at the CDL. Under the current configuration, the 826Ks can handle the tonnage if they increase their work hours from 4,300 to 5,600 hours per year. Unfortunately, when one of them is down, the remaining compactor is unable to handle the inbound waste tonnage.

So, we recommend that they be replaced by two Caterpillar 836 landfill compactors (or other makes of similar size). A Caterpillar 836K can handle approximately 125 tons of waste per hour – which means that 1 machine could handle most of the inbound tonnage, with the 2nd machine helping during peak tonnage periods. And, if one of them goes down, the remaining machine can – for the most part- hold its own in terms of keeping up with the tonnage.

Komatsu D65 Dozer: This machine is well-suited for placing cover soil, stripping soil, track-walking the waste surface prior to placing cover soil, and a host of other projects where a more detailed, lighter touch is required. We recommend this machine be further integrated into the waste covering operation.

Articulated Haul Trucks: We believe that the three (3) articulated haul trucks currently at the landfill is excessive. By adopting a Pancake Cell Construction (PCC) system, we estimate that the daily cover process will require approximately 1.5 hours per day – for 1 truck. Of course, there are other uses for an articulated haul truck, but we do not see the need for three of them. Aggressively, the CDL could likely operate with one truck …or two if a backup is desired. However, because of the wide distribution of these

types of trucks, we would expect that a backup truck could be obtained on fairly short notice. Also, by careful pre-planning (i.e., Fill Sequence Planning), future stockpiles of cover soil could be strategically placed out ahead of the fill operation, making truck down-time much less of a crisis.

Tarp-O-Matic: We recommend that the CDL increase the use of the Tarp-O-Matic. This is a foundational component of the Pancake Cell Construction (PCC) system. In that regard, additional tarps will be required. Also, the CDL crew will be required to improve the geometry of daily cell construction in order to allow consistent utilization of the tarps.

Collections

Collection Overview

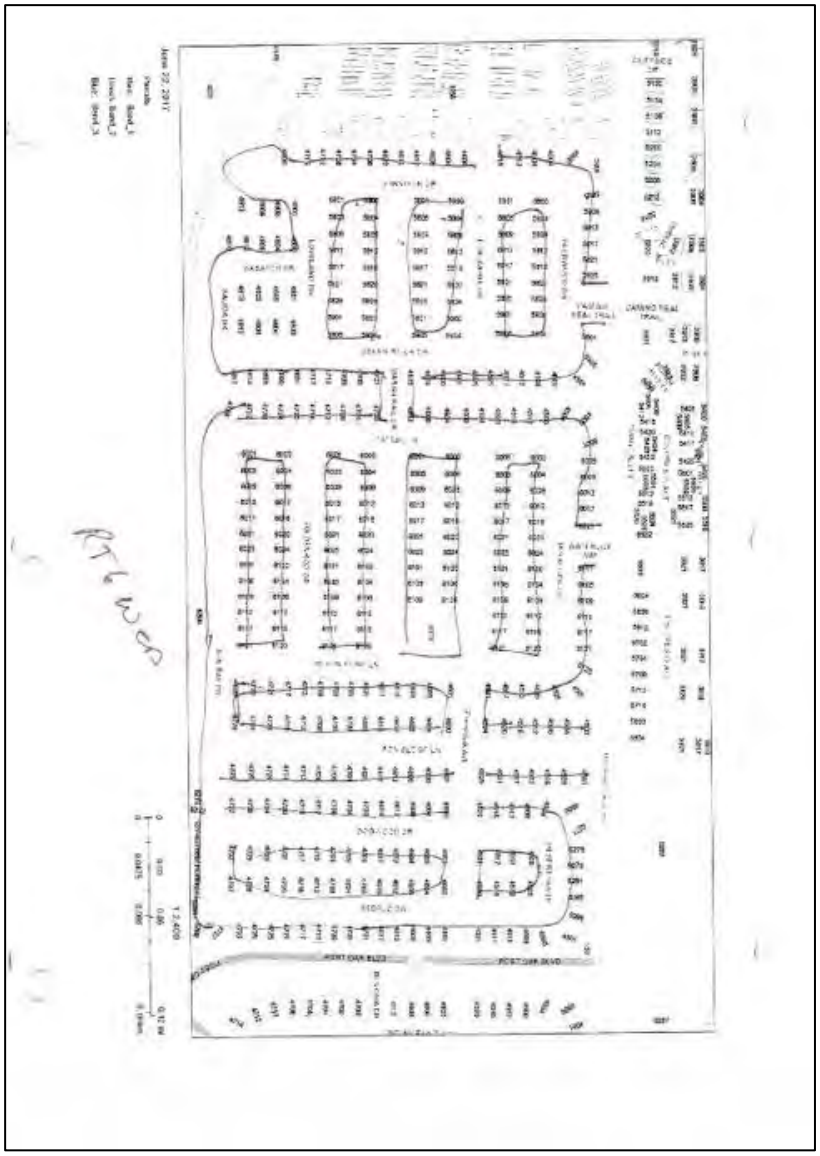
In 2017, City of Denton Collections (CDC) collected 76,984 tons of MSW, 11,050 tons of recyclables, and 7,178 tons of yard waste from approximately 32,000 residential, 2,300 commercial, and 100 scheduled roll-off accounts. CDC provides a variety of services for residential customers including MSW, recycling, and bulky item collection. They also offer door-to-door curbside household chemical collection. CDC provides commercial customers MSW and recycling collection, and they have started collecting food waste.

Dispatch

Commercial routes start at 4:30 a.m. No dispatcher or supervisor is available at the start of the shift. The routes are scheduled the night before and posted in the drivers' computer room. Open routes, no driver available, are listed on the daily schedule. All paperwork is placed in the driver's mailbox along with any special instruction like a notice to pick up or drop off a truck at the maintenance facility.

Drivers complained that because there is no dispatcher or supervisor at the beginning of the shift, they are not able to get the route list for the open routes. It's essential for drivers to get the route list early because almost all routes have time-critical stops that need to be picked up first thing in the morning, to avoid traffic or blocked containers. Drivers claim if a supervisor was available they could get the customer list for the open route early, divide up the time-sensitive stops between themselves and collect them before going on their route, this would save time by avoiding delays due to traffic or blocked containers.

Commercial and residential supervisors start at 6:30 a.m. The same time as the residential and roll-off drivers. Supervisors rotate a late shift to ensure there is supervision at the end of the day.



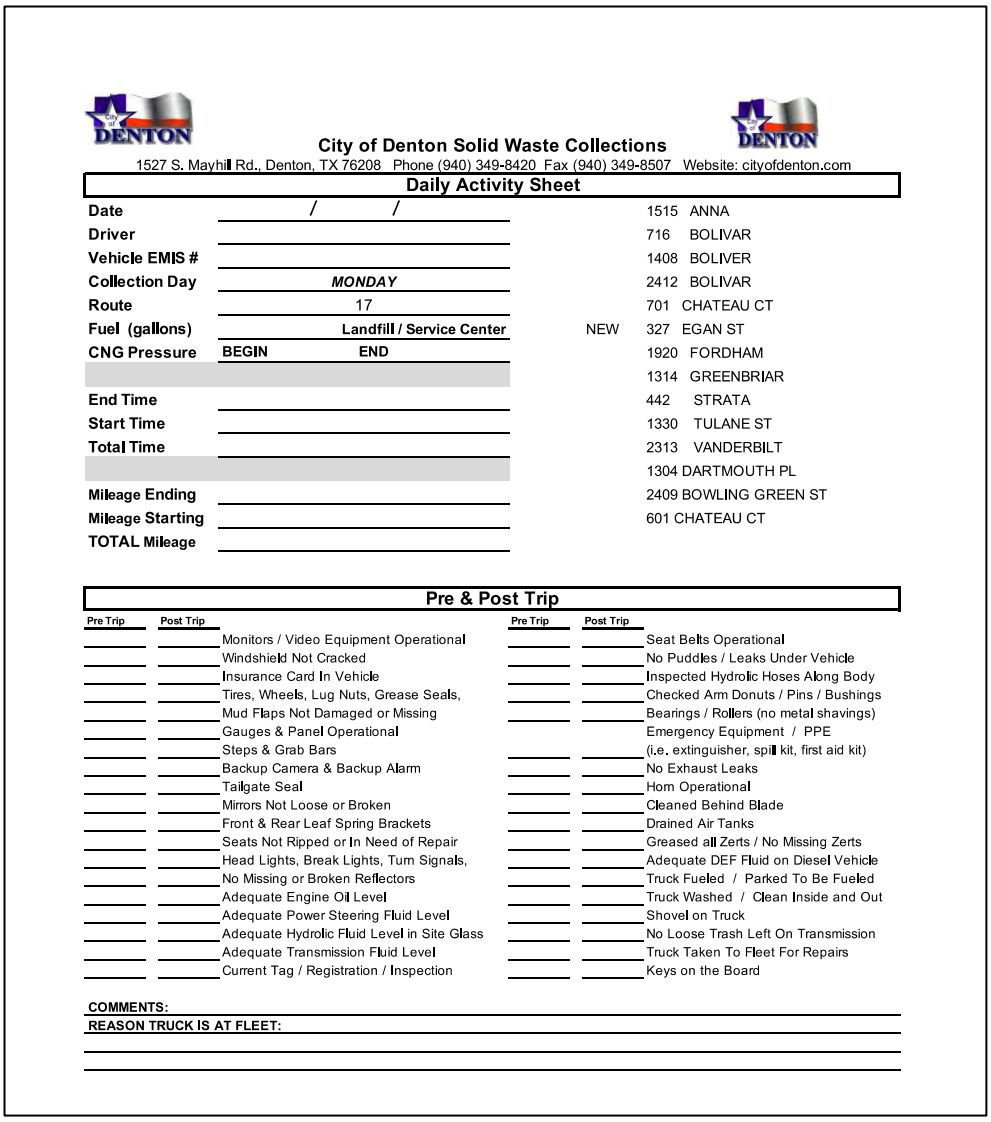
Residential routes are scheduled the night before and revised in the morning for drivers who call in to alert dispatch that they are not reporting for work. All paperwork is placed in the driver's mailbox along with any special instruction. Residential drivers have a chance to speak with supervisors to discuss any truck, route, or customer service issues before they start their route.

Roll-off routes are scheduled the night before, and all paperwork is placed in their mailbox. Like the residential drivers, roll-off drivers have a chance to speak with supervisors to discuss any truck, route, or customer service issues before they start their route. Roll-off routes are adjusted throughout the morning. CDC accepts customer calls for roll-off service up to 11 a.m. Calls before 11 a.m. are dispatched to the driver for a collection that day.

Recommendations for dispatch: A dispatcher/supervisor position is recommended in the Staffing and Organization Chart section located further in this report. See that section for details.

Route and Truck Assignments

Crews are generally assigned to the same route with the same truck every day. This practice allows for the consistent collection and improves customer service. However, when there are open routes or not enough trucks, drivers and trucks are shuffled to ensure that all material is picked up before the end of the workday.



City of Denton Solid Waste Collections

1527 S. Mayhill Rd., Denton, TX 76208 Phone (940) 349-8420 Fax (940) 349-8507 Website: cityofdenton.com

Daily Activity Sheet

Date	/ /
Driver	
Vehicle EMIS #	
Collection Day	*MONDAY*
Route	17
Fuel (gallons)	Landfill / Service Center
CNG Pressure	BEGIN END
End Time	
Start Time	
Total Time	
Mileage Ending	
Mileage Starting	
TOTAL Mileage	

1515	ANNA
716	BOLIVAR
1408	BOLIVER
2412	BOLIVAR
701	CHATEAU CT
NEW 327	EGAN ST
1920	FORDHAM
1314	GREENBRIAR
442	STRATA
1330	TULANE ST
2313	VANDERBILT
1304	DARTMOUTH PL
2409	BOWLING GREEN ST
601	CHATEAU CT

Pre & Post Trip

Pre Trip	Post Trip		Pre Trip	Post Trip	
		Monitors / Video Equipment Operational			Seat Belts Operational
		Windshield Not Cracked			No Puddles / Leaks Under Vehicle
		Insurance Card In Vehicle			Inspected Hydrolic Hoses Along Body
		Tires, Wheels, Lug Nuts, Grease Seals,			Checked Arm Donuts / Pins / Bushings
		Mud Flaps Not Damaged or Missing			Bearings / Rollers (no metal shavings)
		Gauges & Panel Operational			Emergency Equipment / PPE
		Steps & Grab Bars			(i.e. extinguisher, spill kit, first aid kit)
		Backup Camera & Backup Alarm			No Exhaust Leaks
		Tailgate Seal			Horn Operational
		Mirrors Not Loose or Broken			Cleaned Behind Blade
		Front & Rear Leaf Spring Brackets			Drained Air Tanks
		Seats Not Ripped or In Need of Repair			Greased all Zerts / No Missing Zerts
		Head Lights, Break Lights, Turn Signals,			Adequate DEF Fluid on Diesel Vehicle
		No Missing or Broken Reflectors			Truck Fueled / Parked To Be Fueled
		Adequate Engine Oil Level			Truck Washed / Clean Inside and Out
		Adequate Power Steering Fluid Level			Shovel on Truck
		Adequate Hydrolic Fluid Level in Site Glass			No Loose Trash Left On Transmission
		Adequate Transmission Fluid Level			Truck Taken To Fleet For Repairs
		Current Tag / Registration / Inspection			Keys on the Board

COMMENTS:

REASON TRUCK IS AT FLEET:

Route Maps and Route Lists

All residential drivers are given a map of the day's route. Their pre/post-trip form has a section for customers that have special service requirements.

Residential Collection

Introduction

CDC operates a variety of truck styles and models to collect all residential material curbside including municipal solid waste (MSW), recycling, yard waste, bulky items, and household chemical collection. Drivers work four 10-hour days Monday through Friday. The MSW and recycling routes have a single driver/operator. All other routes have a two-person crew except the grapple route and the hybrid route. The grapple route has a single driver/operator, and the hybrid route has a three-person crew.

Residential Route Profile							
Material/Truck	Routes	Days	Crew Size	Average Lifts/Day	Loads/Day	Average Tons/Load	Average Hours/Day
MSW *	7.25*	4	1	1,120	2	8	10
Recycling *	7.25*	4	1	1,120	2	4	10
Hybrid, half MSW, half	1	3	3	450	2	N/A	10
Yard Waste	4	4	2	128	1	4	10
Brush, Grapple	2	4	1	18	N/A	N/A	10
Bulky Items	1	4	2	35	N/A	N/A	10

*The Department also runs one extra MSW and one extra recycle route one day a week on Tuesday

Residential Trash Collection

There are seven 4-day residential automated side-loader (ASL) MSW collection routes. CDC runs one additional MSW route on Tuesday. All routes have a single-person, driver/operator. According to the response to our questionnaire, each MSW route has 1120 scheduled lifts per day. Based on our experience, 95 to 98 percent of customers put their MSW cart out for collection each week. Consequently, each route makes about 1,064 to 1,097 lifts/day.

A report prepared for the Solid Waste Association of North America (SWANA) states that automated routes can make about 950 to 1,000 lifts a day. This lift count should be considered a guideline and not a hard and fast rule. Productivity can vary from community to community and route to route depending on topography, housing density, distance to the post-collection facility, traffic, and other factors.

Recommendation for Residential Trash Collection:
CDC should conduct an objective study to determine if the residential MSW route lifts per day provide for a full day's work. Although 1,000 lifts/day appears reasonable, the crews work 10-hour days. It is possible that the routes can be made larger.

Residential Recycling Collection

There are seven 4-day residential ASL recycling collection routes. CDC runs one additional recycling route on Tuesday. All routes have a single-person, driver/operator. It is unusual to have 1:1 ratio of MSW routes to recycling routes because the setout rate (the number of carts set out on any given collection day) for recycling carts is usually between 60 and 70% compared to 95 to 98% for MSW carts.

The response to BRS's questionnaire listed recycling route with 1120 account or drive-bys a day, the same as MSW routes. The actual set-out rate is not known, but it is low based on the tonnage collected. The recycling drivers drive by the same number of homes as the MSW drivers, yet they collect only 22% of the residential tonnage, excluding yard waste.

Low tonnage indicates that the recycling cart setout rate could as low as 50%, or that the carts on average are 25 to 50% full.

At an assume setout rate of 50 to 60%, recycling drivers make between 561 and 672 lifts per day. This lift count is low compared to the MSW routes that make between 1064 to 1098 lifts per day. A more reasonable lift count for recycling routes is 90 percent of MSW routes or 960 to 990 lifts per day because recycling routes drive by more houses to make their lift count each day.

Another factor indicating low productivity is the average recycling truck payload of 3.88 tons. The maximum legal payload for recycling trucks is about 9 tons. The recycling routes are averaging less than 50% of the maximum legal carrying capacity of the truck.

Recommendation for Residential Recycling Collection:
CDC should conduct residential recycling route audits to determine the setout rate and volume per cart. The audits can be done by the supervisors who drive the street before the driver collects the recyclables and count the number of recycling carts out for collection and check the volume. If a more independent audit is necessary, perhaps someone from the Customer Service Department can conduct the audit as part of their on-route training. A third option is to hire a summer, college-level, intern to do the audit. Ideally, each route should be audited for four consecutive weeks to get an accurate picture of the recycling setout rate and cart volume.

After completing the route audits, adjust the recycling routes lift count between 960 to 990 lifts per day or more, depending on the productivity level goal. If the route audits show that cart are less than one half full, CDC may consider collecting recycling every other week.

Residential Yard Waste Collection

There are four 2-person rear-loader routes and two grapple trucks that collect yard waste. The rear loader crews drive by almost 2,000 houses per day averaging less than 4 tons per load; that's less than 50% of the truck's carrying capacity.

The yard waste crews drive their route looking for piles and plastic bags of yard waste to collect, averaging about 128 collections per day. If a pile has large material, the grapple truck driver is contacted to assist with collecting the material. The grapple trucks make about 18 collections per day.

CDC's yard waste collection system is slow, leaves a mess, is inefficient, and unsafe.

Slow: The yard waste piles are loose and untied. Leaves and grass are in plastic bags. The collectors wrap their arms around the loose branches walk to the back of the truck and throw the material into the truck's hopper. The plastic bags with are opened and emptied into the hopper. The empty bags are balled up and placed in a plastic bag hanging on the side of the truck. The whole process is time-consuming.

Mess: Some of the piles have branches with leaves, small branches, or other loose material. During the process of hand-loading the truck, the collector spills material on the street. Although they attempt to clean it up, they leave a fair amount of the material behind.

Inefficient: The loading is all done by hand with a 2-person crew driving past 2,000 homes. Two-person crews have a lot of non-collection time. When the truck is moving from stop to stop, or repositioning to another location on the route, the helper is non-productive, increasing the cost of the operation.

When there is a large pile, the grapple truck is called in to help load the material. This system is convenient for the customer, but inefficient and costly for the City.

In addition, the rear-loader truck chassis used for this operation is not appropriate for the job. The Peterbilt Model 367 is a high mount truck cab that doesn't lend itself to getting in and out of the truck conveniently and safely. Furthermore, the yard waste crews only make an average of 128 collections a day. The grapple truck operator average 18 collections a day. Both operations are not efficient.

Unsafe: The collection crews collects both sides of the street at the same time, sometimes parking the truck on the wrong side of the street. One crew member walks across the street to collect material and bring it back to the truck. This exposes the collector to traffic driving down the street. In this day and age, with all the distracted driving, walking across the street with an armload of branches or several full plastic bags is dangerous. Also, handling the material by hand exposes the collector to lacerations and puncture wounds, which were 13% of all worker injuries, especially when they wear short sleeve shirts. Loading the material by hand and the frequent walking across the street in traffic makes for a dangerous operation.

Lastly, the helper on the crew rides on the narrow rear steep of the truck, riding for blocks before coming to a pile of yard waste, or riding on the back step when the truck is backing up. According to ANSI Standard Z245.1, a helper should only ride on the back step of the truck when,

1. Truck is going less than 10 mph
2. Truck is going less than 1/5 mile
3. Never ride on the back of the truck when the truck is backing.

Recommendations for Residential Yard Waste Program:
CDC should consider adopting a cart-based system for collecting yard waste similar to the one for collecting residential MSW and recycling. Customers would be required to place all their yard waste in a 95-gallon or other size carts, cutting branches to fit inside. Customers can put excess material in large paper bags that are acceptable to the program. The driver can reload the cart with the bags to empty them into the truck. A cart-based yard waste system is fast to collect, efficient, safe, and doesn't leave a mess.

If the CDC decides to continue with the same system, they should consider mounting the rear-loader truck body on a different truck chassis. Peterbilt makes a lower-entry right-hand drive model. With this type of truck, the Department could eliminate the helper position and go with a single driver/operator.

Residential Bulky Items Collection

CDC collects bulky items from residents. They use one truck with a two-person crew. The crew makes an average of 35 collections a day, low by industry standards, which can range from 100 to 200 collections per day. Bulky collection is a valuable service to the resident; however, the Department should consider a more efficient way to collect the material.

Recommendations for Bulky Items Collection:
CDC should consider running the bulky item route every other week or every third week to increase collections to 70 or 100 per day and more in line with industry standards. The schedule can be seasonally adjusted based on service history.

CDC should monitor the workload daily; if they decide to keep the weekly schedule. When collections for the day are low, the crew could be assigned other duties to fill out their day.

An additional recommendation is to increase the marketing and advertising for the program. These additional campaigns could increase participation and perhaps help deter illegal dumping.

Household Chemical Collection

The Household Chemical Collection (HCC) operation provides residential pickup of household hazardous materials such as:

- Paints
- Cleaners
- Pesticides, herbicides, and insecticides
- Fertilizers
- Etc.

A total of 4 employees currently operate the HCC (1 Supervisor and 3 HCC Techs). Residents call to request a pickup, which will be handled by 1, or sometimes 2, HCC employees on the residents regular collections day. These collections are conducted using an HCC pickup truck with material handling bins in the truck bed.

The HCC also operates a ReUse store where select items are stocked, and customers can collect up to four items at a time. The ReUse store is currently open:

- Wednesdays, 12 pm to 6 pm
- First and third Saturdays of each month, 7 am to 12 pm

In FY 2017, expenditures for the HCC totaled $485,741. Projected budgets for FY 2018-2021 are all above $500,000. The HCC, particularly the residential collection service, is a very expensive operation that not all City residents get use of. In FY 2017, HCC conducted 3,899 pickups, meaning only 12% of the 32,605 residential customers utilize the service.

Household Chemical Collection	
	Residential Pick Ups
2012	2,991
2013	3,130
2014	3,465
2015	3,590
2016	3,793
2017	3,899

The HCC provides a level of service for household hazardous materials that is excessive by industry standards, and is being funded by residents who do not utilize the service.

Our interviews revealed that residents often attempt to drop off material to the HCC building. In multiple instances, illegal dumping of household hazardous material has been discovered at the blue bin site on Mayhill Road or in surrounding areas following the refusal to accept a resident's material.

With the above factors in mind, we recommend that SWRD discontinue the HCC residential collections service, and instead obtain the appropriate permitting to operate as a regional drop-off facility only. This would allow SWRD to:

- Immediately reduce the ongoing costs of HCC operation
- Sell vehicles currently used for the HCC
- Better utilize staff, and avoid the hiring of an additional employee when regional drop-off begins

Commercial Collections

Commercial Trash Collection

The commercial division of CDC collects MSW, comingled paper, cardboard and food waste. There are seven MSW routes Monday through Friday, one hybrid route on Tuesday and Friday that collects one load of MSW and one load recyclabes and two Saturday MSW routes. The Monday through Friday MSW routes average 102 lifts per day. This lift count is low considering that all the containers are considered "stabs"[1], which is the most productive way to empty front-loader containers.

Occasionally, though, a driver may have to exit the truck to open and close a gate to an enclosure.

The industry average for front-loader collection routes can vary from 100 to 150 lifts per day. The variance is due to many variables including how many times a driver exits the cab to retrieve and return a container to and from its original location, drive-time between

[1] Stab is a term of art that means the driver can empty the container without getting out of the truck cab by lowering and aligning the lifting forks and inserting them directly into the lifting pockets on the side of the container to raise and empty it. This eliminates the need to get out of the truck to push or pull a container in to position to be lifted. This method is by far the most efficient way to empty front-loader containers.

stops, the number of containers per stop, and distance and time to the post-collection facility. The most critical variable, though, is how many times a driver exits the cab to push a container to the truck to be emptied and returned to the storage location. It's not uncommon for drivers in dense urban areas to retrieve and return 90 percent of their containers. The distance can vary from a few feet to line up a container to be emptied to hundreds of feet to retrieve and return a container from behind an apartment complex. SWRD decided to eliminate wheels on containers allowing direct access by the truck for quick and easy collection. With this accommodation, BRS would expect that productivity for front-loader routes to be at the high end of the range of 125 to 150 lifts per day.

Saturday Commercial Trash Collection

The two Saturday commercial MSW routes average 97 lifts per day. The route sheet lists 88 customers that have three-times a week collection or less and do not require Saturday collection. A good rule of thumb to qualify customers for Saturday service is a minimum of four-times a week service.

The second route was added so there would be two Saturday routes. The rationale was that if a driver has a problem, the other driver could help out. If there is a problem on Saturday, a supervisor should be notified. The supervisor has the resources, knowledge, and wherewithal to handle any situation that arises. A driver who needs assistance is better off calling a supervisor rather than another driver who may not have the necessary resources to help.

The commercial side-loader route is a four-day route, no Tuesday route, and makes an average of 106 lift/s day. Friday is an exceptionally light day with only 45 lifts. The average lift count on the other three days is 125 lifts per day.

Commercial Route Profile						
Material/Truck	**Routes**	**Crew Size**	**Average Lifts/Day**	**Loads/Day**	**Average Tons/Load**	**Average Hours/Day**
MSW	8 M W F 7 T H*	1	102	3	9	8
Recycling	3 M F 2 T W H*	1	62	1	N/A	8
Hybrid, Half-day routes MSW/Recycling	1 T H*	1	N/A	43101	N/A	8
Commercial Side-Loader	1 M W H F	1	106	N/A	N/A	8

*H=Thursday

Recommendations for Commercial Trash Collection:

BRS recommends increasing the lift count on Monday through Friday routes by eliminating two routes, one Monday through Friday route to increase the lifts per day to

116 from 102, and one Saturday route by moving the 88 Saturday customers that have three-times a week or less service to the Monday through Friday routes. This change will increase the lift count to 119 from 116 lifts per day. The remaining Saturday route will have 106 lifts per day.

Eliminating one Monday through Friday route and one Saturday route will increase the lifts/day counts to 119, and more in line with industry standards. This change is a reasonable productivity target considering that the drivers "stab" all their containers, exiting the truck cab occasionally, to open and close a gate to an enclosure.

Commercial Recycling Collection

There are three full-day recycling routes on Friday, two full-day routes Monday, Tuesday and Thursday, and one full-day route on Wednesday. CDC runs half-day or hybrid routes Monday through Thursday.

Commercial Recycling Route Profile					
Routes	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Full-Day	2	2	1	2	3
Hybrid Cardboard	1/2				
Hybrid Commingle	1/2	1/2	1/2	1/2	
Hybrid Food			1/2		
Hybrid MSW		1/2		1/2	

A complicated route schedule like the one is a red flag and deserves a closer look. Half-day routes are never as productive as full-day routes. A review of the productivity report bears this out. Recycling routes make on average 68 lifts per day. This lift count is considerably low compared to industry standards.

Another factor indicating low productivity for these routes is the average payload of 3.14 tons. The maximum legal payload for these trucks is about 9 tons. The recycling routes are averaging less than 50% of the maximum legal carrying capacity of the truck.

Recommendation for Commercial Recycling Collection:
BRS recommends a complete review of the commercial recycling routes. CDC runs 2.6 five-day routes making an average of 68 lifts per day, substantially lower than the industry average for recycling routes of 150 lifts per day. Generally, recycling containers are not filled to capacity on service day. Consequently, the recycling routes could handle 150 lifts per day or more. CDC should audit the recycling containers to determine the appropriate service level for each customer, then adjust routes accordingly.

Multi-Family Recycling

It is our understanding that the City is looking to significantly expand CDC recycling for multi-family housing customers. Multi-family recycling is one of the most challenging sectors when it comes to minimizing contamination. Our visit to Pratt Recycling indicated that recyclables delivered by CDC have become increasingly contaminated over time, and we believe adding multi-family recycling to the mix will only exacerbate the problem.

Recently implemented international standards for contamination (e.g. China's current 0.5% contamination rate threshold) have created volatility in recycling markets. While the full extent and long-term effects are not known at this time, there will no doubt be changes to the industry in regard to various types of recycling – and the associated contamination.

Based on these factors, we recommend that the City wait for current markets to stabilize before making a decision on whether to expand multi-family recycling.

Alternatively, if the City decides to move forward with this program, we strongly suggest that pilot program be implemented at a handful of representative multi-family units. This would allow the City to better understand – and measure – the impact such a program would have overall.

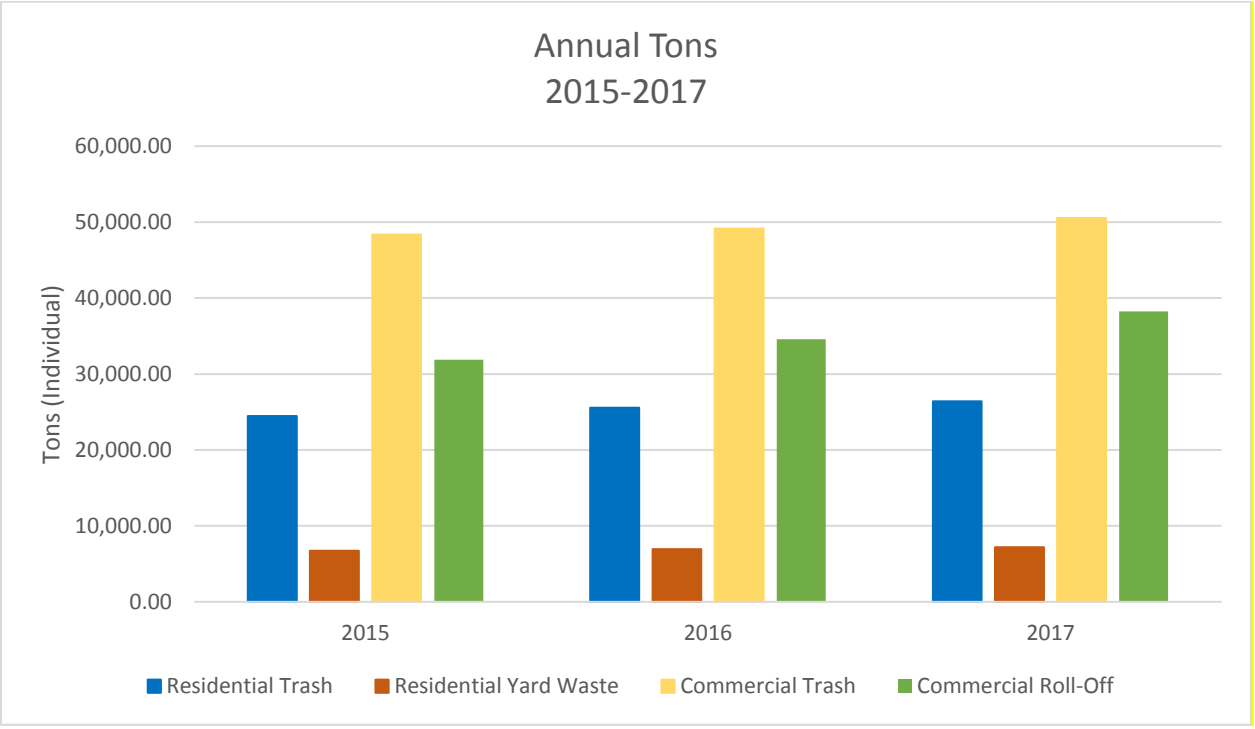
We also caution the City against making policy changes simply because another municipality has implemented a program. We often see recycling (diversion) numbers that are exaggerated. It is important to remember that much of the diversion success that was being quoted by many municipalities in the U.S. was not real – something that was recently exposed by China's recent policy change.

Collection Tonnage

CDC collected 133,453 tons of material in 2017, 76,984 tons of MSW, 11,050 tons of recyclables, and 7,178 tons of yard waste. The average annual tonnage for the last three years has grown by 4.24% driven by a 9.54% average annual growth rate in roll-off tonnage. Excluding roll-off, the average annual tonnage growth rate was 2.32%.

The average annual growth rate for residential and commercial recycling tonnage over the last three years has slid by -0.86%, and -4.48% respectively. This decrease may be due to the increase in contamination noted by Pratt Recycling's General Manager during BRS's tour of their plant. The decrease in tonnage could also indicate that residents are not recycling as much as in previous years.

Tonnage Profile						
Material	**2015**	**2016**	**2017**	**Avg. Annual Growth**	**Number of loads**	**Average Tons/ Load**
Residential MSW	24,483	25,562	26,424	4%	9,315	8
Residential Recycling	7,736	8,126	7,576	-1%	6,041	4
Residential Yard Waste	6,748	6,923	7,178	3%	5,517	4
Commercial MSW	48,336	49,156	50,560	2%	16,195	9
Commercial Roll-Off	31,871	34,570	38,241	10%	28,271	4
Commercial Recycling	3,637	3,657	3,474	-4%	3,426	3
Total	**122,811**	**127,994**	**133,453**	**4%**	**68,765**	**6**
Annual Growth		**4%**	**4%**			
Annual Growth w/ o RO		**3%**	**2%**	**2%**		



Over Weight Truck Loads

The maximum legal weight limit for a three-axle truck in the State of Texas is 54,000 pounds and the manufacturer's gross vehicle weight (MGVW) limit for CDC three-axle collection trucks is 66,000. The tonnage data from January 2015 to April 2018 showed 22,616 loads that were above 54,000 pounds, of which 2,938 loads were above 66,000 pounds.

Number of Overweight Truck Loads			
Category	**>54,000***	**>66,000****	**Total**
Residential	5,182	15	5,197
Commercial	12,740	2,731	15,471
Roll-off	1,756	192	1,948
Total	**19,678**	**2,938**	**22,616**

*54,000 pounds is the State of Texas legal weight limit for 3-axle

**66,000 pounds is the Manufacturer's Maximum Gross Vehicle Weight for the 3-axle trucks used by the Department

Driving a vehicle heavier than allowed by the state's weight regulations is not a good practice. Driving a vehicle above the manufacturer's Gross Vehicle Weight limit is dangerous. First, the trucks are not designed to carry that much weight. It puts undue stress on the vehicle components, which could cause them to fail, like brakes, axles, and tires, or even the frame to crack. Failure of any one of these components puts the driver and the surrounding vehicles at risk. Furthermore, in the event of an accident with a serious injury or a fatality, the SWRD assumes a greater liability because the truck is heavier than the MGVW limit. Drivers should not be allowed to carry loads heavier than permitted by the states weight regulations.

See Appendix B for a list of the 10 heaviest loads for residential, commercial, and roll-off trucks.

Truck Weight Data Anomalies

The truck weight data revealed several anomalies. The tare weights for four residential truckloads and four commercial front-loader truckloads were in the range of 71,220 to 80,960 pounds, twice as much as the normal tare weight. There was one entry in the residential tonnage database that only listed the net tons as 106,978. There were no other entries on that line of the database.

In addition, there were 150 residential load entries with a net weight of less than 2,000 pounds, the weight of about 80 customers.

Recommendations for Keeping Loads Within the Legal Weight Limits:

Supervisors should immediately notify drivers of the rules to keep truck weights under 54,000 pounds. Supervisors should monitor truckload weights daily and bring to the drivers' attention any load that goes over 54,000 pounds.

Supervisors can help the driver stay within the weight limits by calculating the average weight per cart or bin. Then review the route list with the driver. Using the average weight per cart or bin the supervisor and the driver can determine where the driver should end his load. Supervisors should continue to monitor truckload weights and adjust drivers' routes, so the driver stays within the legal weight limits. Eventually, the drivers will know where to cut their route to make sure they stay within the weight limits. The supervisors must continually monitor the trucks weights to ensure drivers comply with the weight limits.

A second method to managing truckload weights is to install onboard scales. The scales give the driver immediate feedback on the weight of the truck.

Onboard scales are expensive and can take a long time to budget, procure, and install. Even with the onboard scales, supervisors will still have to monitor truck weights for compliance. Compliance with weight regulations should be one of the drivers and supervisor's performance measures.

Roll-off Load Weights

The almost 10 percent average annual growth rate of roll-off tons lead to a deeper dive into the numbers. The average roll-off load weighs 3.7 tons, relatively low considering the nature of this service that hauls trash compactor bodies and large open top boxes, some with construction material.

There were 12 loads with a negative or zero net weight, yet the truck tare weights seemed reasonable. There are, however, a few possible reasons for these anomalies. First, the truck may not have been entirely on the scale. Second, the scale attendant may have entered the wrong tare weight for either the compactor body or the open top box on the truck. And last, the scale system could have malfunctioned. In any event, the error should have been identified and corrected by the scale attendant, the driver, or the supervisor on the day it happened.

The data also reveals that 33 percent of roll-off loads are less than 4,000 pounds or two tons. This data suggests that many roll-off customers are candidates for front-load service, a more cost-effective service.

Roll-off Load Weight Profile (2015-2017)			
Pounds	**Tons**	**Loads**	**%of Loads**
Negative Pounds	-	7	0.02%
Zero Pounds	0	5	0.02%
Less than 1,000	1	810	2.87%
1,000-1,500	.5-.75	852	3.01%
1,501-2,000	.75-1	1,333	4.72%
2,001-2,500	1-1.25	1,651	5.84%
2,501-3,000	1.25-1.5	1,621	5.73%
3,000-4,000	1.5-2	3,242	11.47%
Total loads less than 4,000		**9,521**	**33.68%**
Total Roll-off Loads		**28,271**	**100%**

Collection Route Audits

During our meeting with the Customer Service Department staff, they mentioned that the City's customer information and billing software, NorthStar, does not always accurately communicate with Paradigm software that SWRD uses. The city is working on a solution to correct this problem.

Also, the CDC doesn't conduct regular billing and service route audits. It's possible that billing and service information is not correct in the customer database. How much is to be determined. An inaccurate customer database has implications for designing productive routes and potential for lost revenues.

Route audits help ensure the accuracy and integrity of the customer database. It is essential to know how many customers have service, and the number of services each customer receives, in order to bill them accurately.

Good route audits not only assess the service customers receive, they generally increase revenue. A good route audits system ensure that the information identified in the field gets entered into the customer database, any discrepancies are reconciled, and customers are notified and billed for any additional services. If the fieldwork is not followed through with data reconciliation and customer notifications, the route audit will not be successful.

Residential audits have the potential to yield a 1 to 3% increase in revenue, and commercial route audits can generate as much as a 10% increase in revenue. Updating the accuracy and integrity of the customer database has significant impacts on future revenue generation and route productivity.

Recommendations for Route Audits:
CDC should work with the City's IT Department to promptly complete the work on the FME project which links the NorthStar customer information and billing system with SWRD's Paradigm software used to manage the collection operation.

CDC should implement a route audit system that ensures the information gathered in the field is accurately entered into the customer database. The process should notify customers of any changes to their bill and why they were made.

Residential routes should be audited once every three years and commercial routes every two years, with the caveat that if the first audit uncovers significant discrepancies, subsequent audits will be conducted annually until the number of errors diminishes. In addition, a root cause analysis should be performed to determine why errors are occurring and how they can be corrected.

Productivity Reporting

SWRD uses Paradigm's CompuRoute software to manage the CDC customer information database and the back-office operation. They also use Paradigm's CompuWeigh scale system to manage truck weights. Both programs have robust productivity reporting features.

BRS requested copies of productivity reports. CDC was not able to generate the reports from the Paradigm system. They manually created them. Our experience suggests two reasons why the reports could not be generated from the system. First, CDC staff may not be trained how to create the reports. Second, the customer information data may not be correctly entered into the system.

Paradigm Software offers many training opportunities for its customers. Training support is available to customers as part of their active Support Services Agreement; however, in situations where "New User and Refresher training" is required, Paradigm Software will work with the customer to identify the best means available. The training could include on-site at the customer's location, at Paradigm Software corporate office, their annual User Conference, or web-based training.

BRS recommends that SWRD contact Paradigm Software to initiate a review/audit of their program to ensure that the CDC is using the system correctly and if more training is needed.

Routing

Residential Route Design

CDC divides the City into four sections for residential collection. One section is collected each day, Monday through Thursday.

BRS does not know if the routes have even boundaries or if the boundaries meander into one another. The optimum way to design routes is with somewhat even boundaries, so routes don't intrude too much into the adjacent routes.

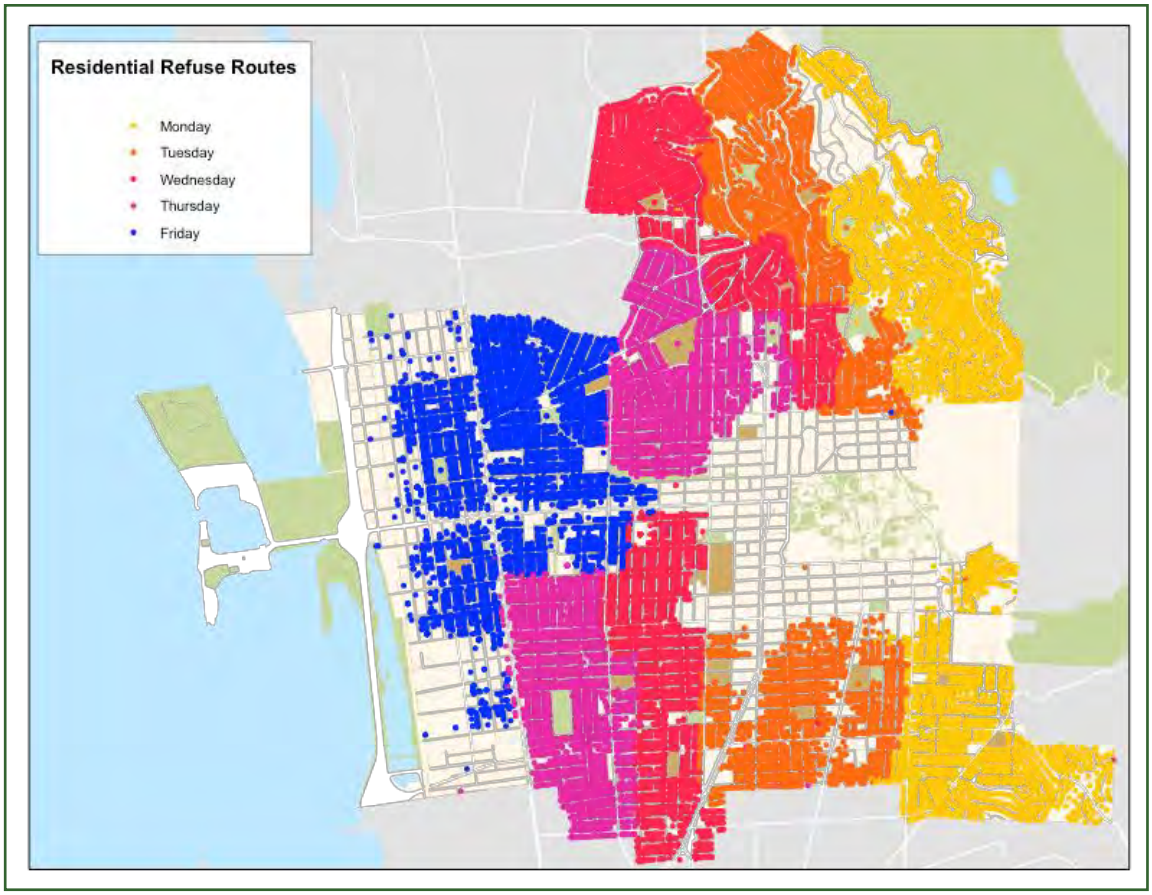
Routes are manually designed using the City's Graphical Information System (GIS) based on the ArcGIS mapping platform. The system is not intended for route optimization but can be used for routing.

When a new route is designed, a supervisor uses GIS to locate the section of the City where the route is to be established. Once the area is selected on the GIS map, the houses are manually counted to determine the lift count for the new route. It's a trial and error

process until the desired lift count is achieved. However, the lift count is not accurate because the system doesn't know how many carts are at each house.

It is possible to automate the process somewhat and develop an accurate lift count. CDC can upload the customer database with collection addresses and the number and sizes of carts to ArcGIS. Additionally, each size cart in the database is assigned a weight and customers with special service requirements can be identified. Now, when the supervisor selects a section of the City, the application will return the number of lifts and total weight for that area. The supervisor can print maps that show the route and the customers who have special service requirements. The supervisor can also decide where the first load ends so that the driver can stay within the maximum legal load limit. This method takes some of the guesswork out of designing routes but is not a substitute for route optimization software.

It is also possible to color code different routes and display them using ArcGIS. This method will show the routes boundaries to see if routes interwind with each other.



Commercial Route Design

Commercial drivers use sequenced route lists to run their route. Route maps are usually not necessary for commercial routes.

BRS does not know if commercial routes have even boundaries or meander into one another. The optimum way to design routes is with somewhat even boundaries, so they don't intrude too much into the adjacent routes.

Over time, especially when a city is growing, commercial route boundaries are notorious for overlapping one another. It happens slowly and unexpectedly. Without a way to see all the routes at one time, it's virtually impossible to know if the route boundaries overlap. Sometimes, though, commercial drivers will notify their supervisor if their route takes them too far into another route's territory.

It's possible for CDC to check commercial route boundaries by uploading the customer database to ArcGIS. The routes can be color-coded and displayed using ArcGIS to show their boundaries. Adjustments can be made if necessary.

Recommendations for Designing Routes: CDC should work with the City IT Department to learn how to use the City's GIS to design and display routes. It will take the guesswork out of designing productive routes.

CDC may want to consider using route optimization software to design routes. This software has a long and steep learning curve. It can, however, design and optimize residential, front-loader, and roll-off routes. Given the right information, the software can sequence and show the driver the travel path of the route, identify time-sensitive stops or when to avoid school zones. The software can also show the driver when to end the first, second, or third load to ensure the truck does not go over the maximum legal weight limit.

Equipment

CDC uses a fleet of 40 trucks to collect residential and commercial MSW, recycling, yard waste, bulky material, and household chemicals, in addition to approximately 15 support vehicles, like container delivery and pickup trucks, and vans. Residential collections use ASL and Rear-Loader (RL) trucks. Grapple trucks are used to assist with large yard waste items. Commercial service uses Front-Loader (FL) and Roll-Off (RO) trucks. There is one Commercial Automated Side-Loader truck (CASL).

Collection Fleet By Category			
Truck Categories	**Frontline**	**Back-up**	**%Back-up**
Automated Side-Loader	14	4	29%
Rear-Loader	6	3	50%
Grapple	2	1	50%
Box	2	1	50%
Front-Loader	9	3	33%
Commercial Side-Loader	1	1	100%
Roll-Off	6	2	33%
Total	**40**	**15**	**37%**

The industry standard for a backup fleet is 15 to 20 percent, depending on the type of trucks and age of the fleet. This standard is not a hard and fast rule, only a guideline. The percentage of backup trucks in the CDC fleet ranges from 29 to 100 percent. ASLs may be a larger percentage of backup trucks because of their high maintenance. CDC uses some of the backup trucks for partial-week and seasonal collection routes. This system accounts for the high percentage of backup trucks for ASL, RL, FL, RO, and grapple trucks.

The CASL trucks have a 100 percent redundancy. This redundancy is inevitable since there is only one CASL route. Consequently, the route requires one frontline and one backup truck. CDC should consider converting CASL bins to FL bins, thus eliminating two specialized trucks and their associated parts. Frontline FL trucks would increase to 10 with

two backups. This move reduces the FL backup trucks to 20 percent, more in line with industry guidelines.

Fleet Maintenance

Overview

Truck maintenance is provided by the City's Fleet Services Department located at 804 Texas Street in Denton, almost 4 miles from the collection Department's parking facility. It makes dropping off and picking up trucks for repairs inconvenient and time-consuming. When drivers drop off their truck for repairs, they need a ride back to the parking facility if another truck is not ready to take back to the yard. In the morning if a truck is available for pick up a driver has to be shuttled to the maintenance facility. Both ends of the repair process are time consuming and inconvenient, causing driver frustration.

Fleet Maintenance, Drivers' Perspective

BRS interview several drivers during our visit. A major complaint and a source of frustration were that it takes too long to get a truck repaired; consequently, drivers avoid dropping off their truck unless it's absolutely necessary. One driver reported that his truck's backup camera doesn't work. He didn't want to take the truck to the shop because he didn't know how long it would take to get it back. A second driver reported his truck has a severe air leak. He didn't want to take his truck in for the repair either because it's uncertain when he would get his truck back. BRS caution both drivers that their repairs constituted a serious safety violation and encouraged them to turn their trucks in immediately for repairs. Other drivers mentioned that they don't turn in their truck for repairs until they have a major breakdown.

Fleet Maintenance's Perspective

During our visit, BRS met with the fleet services superintendent and told him about the drivers' complaints. BRS asked if he had enough technicians to work on the collection fleet. There are 16 technician positions, with one currently vacant, that are responsible for servicing the City's approximately 1,100 assets. This ratio of 1 technician: 69 assets is an issue leading to long downtimes.

The collections industry standard is one technician to 7 to 10 trucks. To minimize truck downtime and improve the quality of maintenance, CDC needs to get their ratio much closer to industry standards. In our visit to Fleet Maintenance, it was clear that every bay is currently being used at the shop and adding additional technicians would be crowded. To address this issue, and reduce equipment downtime, Fleet Maintenance should consider adding additional shifts of technicians later in the day. This swing shift could start at 2 or 3 pm., depending on when collections trucks end their shift. This would allow Fleet Maintenance to perform basic preventative maintenance, which average 2.5 hours, outside of normal working hours. This would potentially allow drivers to get their trucks back the following day and encourage them to get maintenance performed.

The fleet services superintendent identified two additional reasons for the delay in returning trucks to the drivers. First, many times when a truck comes in, there are so many repairs to be made that it just takes a long time to fix everything. Mechanics are trained

to repair anything they find wrong with the truck, not just what is on the repair order. When drivers fail to report minor repairs, the broken part may put stress on other parts of the truck causing other components to fail, requiring more time to repair all the items on the truck. Second, OEM parts can have long lead-times because they come from a third-party vendor or they are on backorder. Both items delay quick turnaround for repairs.

Here is an example of the technician's note for a truck that came in for an air leak on March 8, 2018, and was ready for pick up on March 27, 2018, 13 working days:

The technician repaired the air leak. He also discovered that the CNG tank was due for an inspection, in addition to a CNG tune-up. The truck was also due for preventative maintenance (PM) service. The technician completed all three services. As part of the CNG inspection, the technician repaired the right CNG tank cover. Some parts had to be special ordered. From the description, the CNG tank cover repair required a fair amount of work and wait-time for parts. Also, the technician replaced a light in the instrument cluster, repaired a broken wire for the right side working light, installed a new bumper and reflective tape. During the PM the technician discovered both tarp cylinders and the long hoses on the cylinders were leaking. He replaced the cylinders and the hoses. The technician also fixed the right front fender. Bolts were missing and the bracket that holds the fender needed to be welded.

From the technician's notes it is easy to surmise that the driver chose not to bring the truck in for several obvious repairs thus, taking extra time to fix the truck and delaying its return to the driver.

As previously mentioned, drivers are frustrated because it takes too long to get their truck back from the shop and they never know the repair's status. The Fleet Services Superintendent said that drivers could access FASTER, the fleet maintenance software, to review the status of their truck repair. This system is remarkable and can reduce driver frustration. Naturally, the drivers will have to be trained on how to use the software.

Maintenance/Driver Safety Issue

Supervisors and drivers do minor maintenance work on trucks. Drivers complain that it takes too long for a technician to respond to a road call, and that it's faster if they do the repairs themselves. They make minor repairs to keep the truck running and the driver on schedule, like. changing a light bulb, replacing a windshield wiper blade, or fixing a mirror. Supervisors and drivers are allowed to draw parts from inventory to make the repairs. At first glance, this practice seems efficient and harmless. Sometimes, unknowingly though, a minor repair done by an untrained person can turn in to a major repair, or worse yet, cause an injury. Technicians are trained to correctly and safely make repairs, drivers and supervisors are not. If this practice is to continue, fleet services and the collection department must come together to develop a list of repairs that supervisors and drivers can make, then train them to correctly and safely make the repairs on the list.

There is one repair that needs immediate attention. The Mantis front-loader truck body has a design flaw that allows debris from inside the body to make its way on the packer blade roller track and disrupt the sensors, not allowing the packer blade to function correctly. Drivers climb on the side of the truck body to clean the sensors that regulate the packing blade. Climbing on the truck without proper safety equipment is a dangerous practice and should be discontinued. CDC should work with the fleet services and the manufacturer to develop an engineered solution to resolve this problem or devise a safe procedure to clean the track to allow the packing blade to function correctly.

Joint Meeting, Fleet Services and Collection Departments

BRS mentioned to the fleet services superintendent that it might be helpful if he occasionally meets with the drivers to explain the challenges they face maintaining the collection fleet. This meeting would initially allow the drivers to vent their frustration, then move on to develop a mutual understanding of the importance for drivers to bring their truck in for repairs, as soon as they are discovered. It might also be helpful to bring along a technician that can provide a first-hand account of the personal challenges they face when a truck comes in for repairs. A technician and a driver talking face to face can develop a peer to peer relationship. It will foster a better relationship between the drivers and the technicians who repair their trucks.

Recommendations:

1. Draft an SOP requiring drivers to turn in their truck as soon as they discovered that repairs are needed. This should be part of their daily pre/post-trip inspections. Reinforce the SOP requirement at tailgate meetings and huddles by reminding drivers of their responsibility to keep their truck properly maintained.
2. Draft an SOP requiring supervisors to complete a quality truck safety and maintenance inspection on each vehicle at least one time a month. This requirement should be part of the supervisor's performance review.
3. Schedule a training session to teach drivers how to access FASTER, so they can view the status of their truck repair.
4. Fleet Maintenance should develop a list of parts that require special orders or have long lead times. A supply of these parts should be kept in inventory to aide quick turnaround times when trucks come in for repairs. A process should be put in place to immediately reorder these parts as soon as they are taken out of inventory.
5. Schedule periodic meetings with fleet maintenance services and drivers. The purpose of these meetings is to develop a mutual understanding of the challenges drivers and technicians face when a truck goes in for repairs, especially if the truck repairs have been neglected or if a major repair is required.
6. CDC and fleet maintenance should develop a list of repairs that supervisors and drivers can make. Supervisors and drivers must be trained to correctly and safely make only the repairs on the list.
7. The method the drivers use to clean the packer blade roller track on the Mantis truck body is dangerous and unsafe. CDC should work with fleet services and the manufacturer to develop an engineered solution to resolve this problem or devise a safe procedure to clean the track to allow the packing blade to function properly.

Fleet Maintenance Annex

During our visit, BRS toured the maintenance facility. The superintendent mentioned that they had outgrown it and that the needs to be expanded. In a separate interview, the SWRD Director said that they have a fleet maintenance annex project on hold. The timing couldn't be better. Locating a truck maintenance facility on the same property where the trucks are parked is ideal, not only for the drivers but also for the technicians who work on the trucks.

Recommendation: The City should consider constructing a maintenance shop annex close CDC's truck parking facility. A shop next to the parking facility makes it convenient for drivers to drop off their truck for repairs, reducing driver frustration and encouraging

them to turn in their truck for repairs immediately when needed. It also makes it convenient for fleet services to retrieve trucks for preventative maintenance services and other repairs.

Pre-Post Trip Inspections

The City is required to comply with the FMCSA regulations as stated in Code of Federal Regulations (CFR) Title 49/Subtitle B/Chapter III/Subchapter B/Part 383.3 (a) Applicability, "The rules in this part apply to every person who operates a commercial motor vehicle (CMV) in interstate, foreign, or intrastate commerce, to all employers of such persons, and to all States."

The CDC process for drivers completing pre/post-trip inspections is not in compliance with FMCSA regulations. A new procedure must be put in place to meet the regulations.

Pre-trip inspections are required by FMCSA regulations 396.13: Driver inspections and 392.7: Equipment, inspection, and use. The regulations clearly state that drivers are required to conduct a thorough pre-trip inspection, review and sign the last driver vehicle inspection report if any defects or deficiencies were previously reported.

Post-trip regulations are governed by FMCSA regulation 396.11 Driver Vehicle Inspection Report.

This regulation requires drivers to conduct a thorough post-trip inspection at the completion of the day's work and to list any defect or deficiency discovered by or reported to the driver that would affect the safe operation of the vehicle or result in its mechanical breakdown.

As of 2014, drivers of commercial vehicles, other that passenger-carting commercial vehicles are not required to turn in a report if no defect or deficiency is discovered by or reported to the driver. As a practical matter, CDC should require drivers to turn in a completed and signed post-trip inspection report every day regardless if they find defects or deficiencies.

FMCSA regulation 396.11 further states in paragraph (3) Corrective action, "Every motor carrier or its agent shall certify on the original driver vehicle inspection report which lists any defect or deficiency that the defect or deficiency has been repaired or that repair is unnecessary before the vehicle is operated again."

These regulations have implications for the vehicle maintenance department. According to the regulation, the mechanic who made the repair(s) must certify on the original report that the repair was made, or it was unnecessary. This will require CDC to revise its pre/post-trip Driver-Vehicle Inspection Report (DVIR) procedure.

Recommendations: CDC should draft an SOP for a new pre/post-trip procedure that requires that a copy of the DVIR remain in the vehicle, so the mechanic can certify that any necessary repair(s) was performed, and so that the driver can sign off that he reviewed the previous report and acknowledges that any necessary repairs were certified as being completed.

Solid Waste and Recycling Department

Introduction

The following sections discuss our findings and recommendations that apply to the entire SWRD (Landfill and Collections).

Safety

Truck Accident and Worker Injury Report Analysis

SWRD provided truck accident and worker injury data for March 2015 through March 2018. The data was incomplete and difficult to analyze. There were 172 records; 157 records did not contain a source of the incident and 154 did not contain a cause. Two incidents did not include any description.

The few entries that listed a cause were not categorized in a meaningful way to analyze the data. To provide some analysis, BRS categorized the incidents based on our experience and knowledge of the subject matter.

Truck Accidents

During the study period, there were 88 truck accident claims. The top three accident categories, Hit Parked Car or Stationary Object, Backing Accident, and Property, accounted for 84% of the claims.

There were 10 truck accidents that could not be categorized or evaluated based on their description. Here are three examples of claims that could not be evaluated, Waters Edge Apartments [sic] Wants reimbursed [sic] for electrician bill; Wind blow [sic] the gate closed; and Auto Accident. More care should be taken when writing and recording claim details.

Truck Accident Summary		
Description	**Number**	**Percent***
Hit Parked Car or Stationary Object	39	50%
Backing accident	13	17%
Property Damage	13	17%
Pulled Down Power Line	6	8%
Hydraulic Fluid Spill Caused Accident	3	4%
Hit Moving Vehicle	2	3%
Rear Ended Vehicle	1	1%
Theft of City Property	1	1%
Total	**78**	**100%**

*Percentages may not add up to 100 due to rounding.

The 39 incidents of hitting a parked car or stationary object included 4 incidents where a driver hit an overhead bridge. There were another 6 incidents where a driver pulled down a power line. It's important for drivers to stay focused and be on the lookout for overhead dangers. When drivers identify an overhead danger, they should avoid it and immediately notify their supervisor. The supervisor, in turn, should alert all the drivers of the danger and contact the appropriate agency to correct the hazard.

Safety meetings should include the topic, "Be Alert for Overhead Dangers." The topic information can be reinforced during tailgate meetings and morning huddles. SWRD should invite the Denton Municipal Electric Department (DMED) to make a presentation at the safety meeting. A new presenter and fresh information are sure to get the drivers' attention. DMED can talk about warning signs for spotting overhead dangers, how to

report them, and what to do if the driver pulls down an electrical wire. Downed power lines are not only dangerous for the drivers, but also for the people nearby.

As an additional precaution, the CDC may want to place a sign on the front of containers that alerts drivers that an overhead danger is present.

Backing accidents were 17% of all truck accident and the second largest category. According to the USDOT Federal Highway Administration, the average driver – age 35-55 – drives over 15,000 miles per year, forward …and less than 1 mile in reverse. But 1 out of 4 accidents occurs when backing. Mile for mile, backing poses 5,000 times more risk of an accident.

Of course, garbage truck drivers log even more miles per year – an estimated 25,000 – although there is wide variability due to route layout and distance to landfill or transfer station, etc. And these drivers also do much more backing than the average individual (non-truck) driver.

That's why safe backing practices are always a prime concern in any collection operation. Backing a large vehicle comes with inherent risks that demand extra caution and constant vigilance. Drivers must always be aware of their surroundings, with or without a spotter or rearview camera, even if it means getting out of the truck and looking around the vehicle to make sure there are no hazards.

A few drivers complained that their rearview camera was not working. They don't want to bring their truck in for repair because it takes too long to get it back from the shop. Not reporting a broken review camera is a serious safety issue and should be corrected immediately. Backing a collection truck has enough inherent risks without increasing them because the rearview camera is broken.

Recommendations Backing Safety

Drivers should use extreme caution when backing with or without a rearview camera. Broken rearview cameras should be brought to management's attention promptly given a priority repair status.

Driver training is critical when it comes to backing a collection vehicle. Part of the training curriculum should include backing under challenging situations including, backing without a camera. Also, CDC should consider preparing an SOP on how drivers should proceed when operating a vehicle without a rearview camera.

Backup alarms are also a critical safety component for garbage trucks. Drivers should be cautious not to disable them and to report broken backup alarms to the shop immediately.

Worker Injuries

During the study period, there were 73 worker injury claims. The top three injury categories, Strains and Sprains; Slip, Trip and Falls; and Struck by or Collided with Object or Equipment, accounted for 59% of the claims.

There were 10 incidents that could not be categorized or evaluated based on their description. Here are three examples of worker injury claims that could not be evaluated, Injury, Right Elbow, and three entries described the incident as Employee hit back of truck while pulling past it.

Worker Injury Summary		
Description	**Number**	**Percent***
Strains and Sprains	18	29%
Slip, Trip, Fall	10	16%
Struck by or Collided with Object or Equipment	9	14%
Cut/Puncture wound	8	13%
Animal or Inset Bite, Scratch, Sting, Kick	6	10%
Eye Injury	4	6%
Burn Injury	3	5%
Illness	2	3%
Heat Exhaustion	1	2%
Caught in/Compressed by Equipment or Objects	1	2%
Auto accident injury	1	2%
Total	**63**	**100%**

*Percentages may not add up to 100 due to rounding.

SWRD's nonfatal injury rate per 100 workers increased substantially from 1.84 in 2016 to 3.5 in 2017, a 90% increase. In 2016, the last date the figures were available[2], the waste industry's nonfatal injury rate was 2.3. SWRD incident rate is 52 percent higher the waste industry as a whole.

Recommendation for Reporting and Tracking Truck Accidents and Worker Injuries:

Accident and injuries reports should be written with more care and attention to the facts. Managers should provide more oversight of the reporting process and the accident and injury record database.

[2] Source: U.S. Bureau of Labor Statistics, U.S. Department of Labor, November 2017

SWRD should work with the City's Risk Management Department to develop guidelines for categorizing truck accident and worker injury claims and writing claims descriptions. At a minimum, the claim description should include the name of the driver, number of years on the job, a clear explanation of the incident including the who, what, when and where.

Separately, the supervisors should collaborate with the operations manager and the Risk Management Department to determine how and why the accident happened, and how similar accidents can be avoided in the future. The cause and avoidance analysis should become subjects for safety meetings and reinforced in tailgate meetings and morning huddles.

SWRD should calculate their truck accident and worker injury incident rates every month. They should be used as benchmark for improvement.

Safety Culture

A strong safety culture is essential for the successful deployment of any safety program. During our visit to observe the SWRD's operations, we sensed the absence of a safety culture. It wasn't because drivers, landfill workers, and management weren't interested in safety, they were. We spoke to many in the department. Not one person shrugged off safety. The problem is related to a lack of continuity regarding safety planning, implementing, and monitoring of safety procedures.

Here is our list of observations that led to this conclusion.

- BRS did not see one safety notice, encouragement, slogan, or safety warning posted anywhere in the SWRD office, including where the drivers congregate.
- Most drivers wear minimal high visibility apparel, gray shirts with orange reflective strips.
- Supervisors and managers do not set a safety example. We observed them not wearing a high visibility safety vest or jacket when walking outside the building, around the trucks, landfill, or in the parking area.
- The safety meeting for the residential collections did not focused on safety training. It was not a typical safety meeting. The meeting consisted of a series of admonishments to the drivers to slow down and be careful. The main focus of the meeting was a sales pitch for Airrosti by Airrosti, a company who bills itself as "We Fix Pain Fast." The topic had nothing to do with safety. The topic was about personal health care. The second half of the meeting was about operations. The drivers were given more admonishments to slow down and be safe. The remainder of the meeting dealt with the low cart inventory, and how they could get their safety boots.

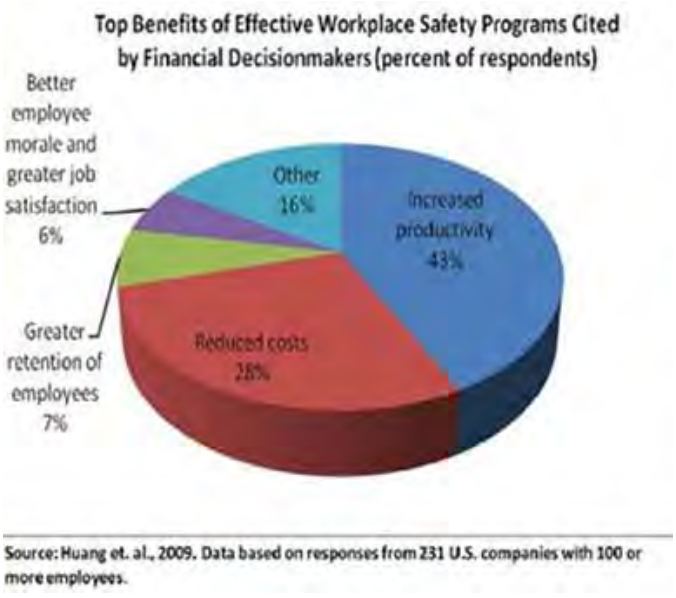
- The landfill's tipping area was very crowded and somewhat chaotic. And while we understand that there had recently been a lot of rain, the fact is, rain occurs every year and the landfill staff should be planning ahead to deal with those conditions safely. We have made some recommendations regarding tipping pad and cell construction activities that will help reduce risk in those areas
- Another safety issue addressed in the meeting was drivers having a problem dumping small carts. If the grabber on the lift arm is not adjusted correctly, the carts slip into the truck's hopper. Drivers were instructed to stop by the shop and have the grabber adjusted. Drivers were also told not to pack the cart, but to retrieve them if the cart falls into the hopper. If drivers couldn't get the cart out easily, they were told to go to the shop, and the shop would pull it out with a hook.

  As a matter of safety, drivers should not be climbing on their truck and reaching into the hopper without the proper training and equipment. This practice is not safe and could lead to a serious injury or even death. However, this could have been a great training opportunity to have the drivers assemble by a truck and demonstrate the safe way to retrieve a cart from the hopper.

Recommendations for Building a Safety Culture

A strong safety culture is the foundation for building a safety program that puts workers' health and safety first, by working tirelessly to prevent accidents, injuries, and illnesses.

A strong safety culture is built over time by management's relentless commitment to protecting workers health and welfare. Safety should be presented and thought of as coaching employees, rather than policing them. Cooperation between management, safety personnel, and frontline workers is essential to building a strong safety culture.



Hold Safety Focused Meetings

CDC holds monthly meetings where safety is part of the program. The other part of the meeting deals with operations. The focus of these meetings should be on safety. Operations items should be discussed at a separate meeting, at tailgate meetings, or during a morning huddle. Safety meetings should focus on safety topics.

The Risk Management Department should continue to develop the safety meeting schedule and topics, paying close attention to OSHA required training. Here is a list of some of industries best practice safety topics.

- PPE, what is required and how to use it;
- Hearing Conservation and Prevention;
- Cold and Heat Stress Prevention;
- Lockout/Tagout;
- Confined Space Entry;
- Fire Extinguisher Training;
- Hazard Communications;
- Spill Response;
- Blood Borne Pathogens;
- Backing Safely;
- Proper lifting techniques;
- Substance Abuse Policy;
- Violence in the Workplace Prevention;
- Slip trips and Fall Prevention

Disclaimer: OSHA required training is job specific. Regulations are in a state of flux and continually changing. Although the City is not required to follow OSHA regulations because the State of Texas does not have a state-approved OSHA plan, CDC in conjunction with the City's Safety Department should review all regulatory requirements to ensure that any training delivered follows the requirements of the latest regulations.

BRS is a strong supporter of having supervisors conduct safety training. The drivers report to them, and the supervisors have the most influence on the drivers. Conducting the safety meetings should be rotated among the supervisors. The City's Risk Management Department should provide supervisors with basic information but require the supervisors to research the topic and prepare their presentation. The best way to learn a subject is to teach it. Holding the supervisors accountable for safety training gives them a vested interest in becoming the Department's biggest safety advocates.

Supervisors should hold weekly tailgate meetings and morning huddles. Tailgate meetings should be regularly scheduled and last between five and 10 minutes. Huddles can be scheduled daily and last no longer than five minutes. The topics and schedule for these meetings should be coordinated through the operation managers in cooperation with the City's Risk Management Department to ensure all supervisors touch on the same topics. The tailgate meeting and huddle topic should reinforce the monthly safety meeting's primary topic or draw attention to a safety issue in the supervisor's district. Accidents and injuries that occurred the previous week should be discussed, ending with how to avoid a

reoccurrence of the same incident. The agenda can be supplement with other safety topics and issues related to quality control and productivity.

Safety Plan

The State of Texas does not have an OSHA approved State Occupational Safety and Health Plan. Consequently, state and local government agencies are not covered by Federal OSHA. In addition, the Texas Workforce Commission states," OSHA does not apply to the federal government, the Texas state government or any of its agencies, or a political subdivision of Texas, such as a city or county government, citing 29 U.S.C. § 652(5)." Since Texas does not have an OSHA approved state plan, OSHA regulations do not apply to the SWRD.

The SWRD does not have a written safety plan. Although OSHA regulations do not require an employer to have one, OSHA has written extensively on the merits of a written Injury Illness Prevention Program (IIPP).

In their White Paper date January 2012, OSHA stated[3]:

> *An injury and illness prevention program is a proactive process to help employers find and fix workplace hazards before workers are hurt. We know these programs can be effective at reducing injuries, illnesses, and fatalities. Many workplaces have already adopted such approaches, for example as part of OSHA's cooperative programs.*

OSHA goes on to say:

> *OSHA representatives have noted a strong correlation between the application of sound management practices in the operation of safety and health programs and a low incidence of occupational injuries and illnesses. Where effective safety and health management is practiced, injury and illness rates are significantly less than rates at comparable worksites where safety and health management is weak or non-existent.*

A written safety plan is key to developing a comprehensive safety program and is the foundation for a strong safety culture. The industry's best practices for safety include a written safety plan. BRS highly recommends that SWRD draft a comprehensive safety plan. The plan should include, at a minimum, these elements: Responsibility and Authority, Compliance, Communications, Hazard Assessment, Accident Investigation, Hazard Correction, Training and Instruction, and Record Keeping.

[3] OSHA Injury and Illness Prevention Programs White Paper, January 2012

High Visibility Safety Apparel

SWRD should develop an SOP regarding Personal Protective Equipment (PPE) and require managers, supervisors, office personnel, operators, drivers, and visitors to comply with the policy.

Drivers, operators, supervisors, and managers should be required to wear high visibility apparel (safety vest at a minimum) at all times when they are in the yard and shop, on the route, or at a post-collection facility. High visibility apparel is the single most important expression of a safety culture.

Most drivers wear gray shirts with orange reflective stripes. Although this is considered high visibility apparel, it is not up to par with ANSI/ISEA standard 107-2015, which recommends Type R high visibility apparel because it "provides daytime and nighttime visual conspicuity enhancement for workers in occupational environments which include exposure to traffic.

SWRD provides frontline workers with PPE and a variety of uniform apparel. Except for the shirts, none of the other outerwear is high visibility. It is not a safe practice to provide a high visibility shirt, then give a jacket or a sweatshirt that is not high visibility. It defeats the purpose of wearing high visibility apparel. All uniforms provided by the SWRD should be Type R high visibility apparel. In addition, it should be branded with the City's logo to go along with the branding on the City's trucks. During our visit, we observed personnel with SWRD issued apparel that did not show the City's logo.

SWRD should also require managers to a wear safety vest whenever or wherever a driver is required to wear high visibility apparel. Management needs to be safety's most prominent advocate. When managers wear a safety vest and other appropriate safety equipment, it shouts their commitment to safety and helps to build the safety culture.

Visitors, including sales representatives and other vendors, staff from other departments and elected officials should be required to wear safety vests and other appropriate safety equipment when they are on the property touring the facilities, in the field visiting drivers on the route, or at a post-collection facility. Safety starts at the top. When the Mayor or other elected official wears a safety vest, it says a lot about the City's commitment to safety and a strong statement about their safety culture.

Along that same line, we strongly recommend that the CDL adopt a policy that requires all landfill customers to wear a safety vest (or other high-visibility apparel) at all times when outside their vehicle. Data on fatalities at waste facilities indicate that more non-employees are killed than employees. And, while many of these incidents are related to over-the-road (collection) trucks, an unacceptable number are killed at landfills too.

Neal Bolton's experience as an expert witness on more than 60 solid waste-related cases, bears this out.

In further support for this problem, please note that we produced nearly 100 safety videos for landfills – videos specifically targeted customer safety.

Customers Safety Vest Program

When enforced, the current customer safety vest program sends a strong message regarding the safety culture of the CDL. We believe that all customers should be required to wear safety vests while at the landfill.

Redesign the Drivers' Room Appearance

The drivers' room should be redesigned to focus on safety-related information. A big screen TV should be installed to draw attention to safety messages that scroll on the screen in addition to other important messages relevant to the operation. It's important to vary the messages and their location on the screen to keep viewers engaged with the content.

Prominently display safety messages in the drivers' room. Include recent editions of "Safety Monday" (available through SWANA), safety messages from the Director and other members of the management team, and safety slogans and warnings.

It's important to draw attention (in good taste) to recent accidents and injuries by briefly describing the incident, what went wrong, and how to prevent a future occurrence. Present the topic on a nicely designed 8½ x 11 or larger poster. It should be placed prominently on a wall, so it draws the drivers' attention or can be pointed to when discussing the subject.

The drivers' room is an excellent place to promote safety. It's a place where drivers visit in the morning and at the end of their day. It is essential to keep the messages, slogans, and briefings fresh by rotating them often. The purpose of the postings is to make safety a constant reminder.

Training

The SWRD does not have a written driver training program. Training for new drivers is not as comprehensive as it should be. The current program is three weeks long as follows:

- Week 1—The trainee rides along with a regular driver to become generally familiar with the truck and collection activities.
- Week 2—The trainee operates the truck on the route while the regular driver rides along providing guidance on how to operate the truck.
- Week 3— The driver drives route alone. (Week 3 is not considered training since the driver is working alone.)

There is no written documentation or written feedback on how the driver performed during the training. Verbal feedback is given to the supervisor. On week three the driver is on his own continuing to learn the intricacies of operating the truck and the challenges of an unfamiliar route. This training program is not a well-devised plan from a safety standpoint.

During our visit it was mentioned that if drivers are available, residential driver trainees go to an area on the property where carts are set up, so they can practice lifting and emptying carts.

Training Recommendations

Training is not a one-time event. Training has to be repetitive and hands-on, to be effective. Sports teams continuously train to get better at their job, so do police and fire Departments. It should be the same for the SWRD.

To improve safety and performance, the SWRD should develop a comprehensive training program that includes classroom work and hands-on training at the landfill, the collections yard, and on the road. The training should emphasize the fundamentals of the job, and target weaknesses identified in safety and performance.

Supervisors should be involved in developing the training curriculum to include basic collection principles, truck operations, safety, and customer service. Supervisors have first-hand knowledge of practical matters to improve safety and performance.

New Drivers

The SWRD should develop a written technical training program for new drivers, and every trainer should be required to follow the program. The program should last about six weeks and include classroom time, in the yard practice, and on the road training (on the job training). The classroom training should be based on the Original Equipment Manufacturers' (OEM) operating manuals that come with each truck, in addition to topics to improve safety and performance. The SWRD has several different types of trucks. It is imperative to tailor the training to each specific truck using the OEM's operating manual for that truck. The training should also include a comprehensive pre/post-trip inspection curriculum based on DOT regulations and City policy, and a defensive driving program.

SWRD should consider using a smaller training route specifically designed to teach new drivers how to collect safely in different scenarios, in addition to using different trucks. Currently, a new driver goes with a trainer and is required to complete a full route. This practice puts stress on the driver and the trainer to achieve full productivity on the first day. Instead of learning safe collection practices the new driver is being forced into full production. A smaller training route takes the pressure off new drivers and their trainers to finish an entire route and allows them to focus on safe collection practices instead of productivity. With time and practice, new drivers will achieve full productivity while using the safe collection methods they learned on the smaller training routes.

As a final check, supervisors should ride with new drivers, within a week or so after the six-week training program is completed and periodically after that for the next two months. This procedure provides the supervisor a first-hand opportunity to gauge a driver's skills, abilities, and safety awareness, in addition to identifying gaps in the driver's training. It also allows the supervisor to recommend additional training based on these observations. Supervisors should be held accountable for the training drivers receive.

Driver Certification
Veteran drivers should be recertified on their current truck every two to four years as part of a continuing education and refresher-training program. The training program should include curriculum based on the OEM's operating manual along with safe collection practices. The training should also include a walk around pre/post-trip inspection, defensive driving, safety, and a performance refresher course.

In addition to completing the continuing education and refresher training, all drivers should be required to take and pass a training program before being qualified to operate a new collection vehicle. When new trucks enter the fleet, SWRD should develop a training program with the curriculum based on the OEM's operating manual. This training should also include a safety and performance refresher course.

Train the Trainer
SWRD should develop a Train the Trainer program. The program should teach general training principles. Supervisors should be involved in developing the curriculum to include basic collection principles, safety, and acceptable performance standards. They have firsthand knowledge of practical matters to improve safety and performance.

The trainer selection criteria should include a skills assessment to determine if candidates have the aptitude to be a trainer. This assessment should be part of the selection process and completed before a candidate is selected to enroll in the Train the Trainer program.

Supervisors should be involved in the trainer selection process. The selection process must be fair and objective and based on the individual's qualifications and training abilities, not on seniority alone. Supervisors know their drivers better than anyone else and can provide valuable insight into the trainer selection process.

In addition to taking and passing the Train the Trainer training, candidates should take and pass truck specific training to become certified to train on a specific type and model of truck.

On-Road Defensive Driver Training
The SWRD should develop a defensive driving program as part of the driver training curriculum. SWRD should consider augmenting the defensive driver training with the Smith System, or similar defensive driving program that includes on-road training. There is no substitution for on-road training. A driver can effectively learn the principles of defensive driving in a classroom. It's essential, however, to put those principles to work with on-road training.

Staff Training

Department managers and supervisors should be required to take training courses to stay current with the ever-changing Federal and State Department of Transportation regulations. In addition to classes on regulations and as part of their continuing education, managers and supervisors should be given the opportunity to take training classes that focus on improving communications skills and explore the latest trends in managing teams. They should also take courses in how to train and motivate individuals. Safety is an attitude, and some individuals have to be motivated for their own safety.

Standard Operating Procedures

Although CDC has a *Departmental Manual for Solid Waste Truck Operators*, it's not a complete set of Standard Operation Procedures (SOP) to guide the staff on how to operate and manage a safe and efficient operation. The SWRD should develop a comprehensive set of SOPs for all CDL and CDC employee tasks. BRS have made a substantial number of recommendations in this report. At a minimum, SWRD should develop SOPs that reflect our recommendations adopted by SWRD.

Organizational Culture

Based on our observations and experience, SWRD provides an overall good and fair work environment for all employees. In the course of our on-site visit, it was clear that SWRD frontline employees were very helpful and forthcoming in supporting this review and interested in making improvements to operational safety and efficiency. The following sections will discuss some specific organizational culture findings within the SWRD.

Collections Driver Scheduling

The operations manager sets the tone for teamwork, as required in the City's Departmental Manual for Solid Waste Truck Operators. Drivers help each other to finish the day's work. No driver completes his route and goes to the landfill, except if their truck is full, until all drivers complete their route. It's a team effort.

Drivers work 40-hour a week. Supervisors work diligently to control overtime, sometimes to the dismay of the drivers. Drivers have complained that they are pulled from their route if completing it would put them into overtime. For example, if a driver has 36 hours when he starts his Thursday or Friday shift, the supervisor will pull the driver from his route at 40 hours and send him home. The uncompleted work is divided up among the drivers who are still working. This practice causes frustration with all the drivers, the one who was sent home and the ones remaining, who just got more work.

If CDC continues monitoring overtime closely and pull driver before they go over 40 hours, they may want to consider giving the driver the option to stay home that day and use paid leave to complete their forty hours. Some drivers may take the option, and other

drivers may want to work the few hours to fill out their forty hours. The decision to work or not is the driver's, and it's easier for him to accept.

This system, however, works both ways. If a driver can't work a full day for personal reasons and needs a few hours off, the supervisor will either reassign the driver to a job that doesn't require a full day's work or give the driver paid leave time to ensure the driver gets 40 hours pay.

It was evident during the interviews that the supervisors go out of their way to make sure the drivers get their 40-hours pay, and the drivers go out of their way to pick up the slack when there is extra work to complete.

Innovation and Specialty Projects

Under the oversight of the previous Director and Landfill Operations Manager, the SWRD undertook or proposed several specialty projects (Landfill Mining, the BMR, Leachate Recovery, HCC collections, etc.). These projects generated excitement in employees, including management staff, due to their intended innovations and the resulting national (and at times international) publicity.

Recent SWRD reviews of financial viability, including this project, have resulted in the discontinuing or downsizing of these specialty projects. It is likely that more of the projects will be impacted in the future as well. Despite the inviable financials, some members of management we interviewed expressed their disappointment in discontinuing what they viewed as "innovative" ideas and projects. It appears that management has passed these thoughts on to some lower level employees as well.

We recommend that SWRD generate excitement in management for improving SWRD operational safety, efficiency, and profitability. Rather than engaging projects solely for the sake of "innovation," SWRD organizational culture should be on that is excited about providing Denton residents an essential service that is safe, efficient, and financially sound.

Staffing and Organizational Chart

A main goal of this project was to provide SWRD with recommendations of how to best utilize available staff and how to structure the organization of employees. The following sections discuss our recommendations for SWRD staffing and organizational structure, assuming full implementation of the operational recommendations contained in this report. The recommended organizational changes are based on our review of SWRD operations, industry standards, and our observations working with similar solid waste operations. Appendix A contains the full recommended organizational chart.

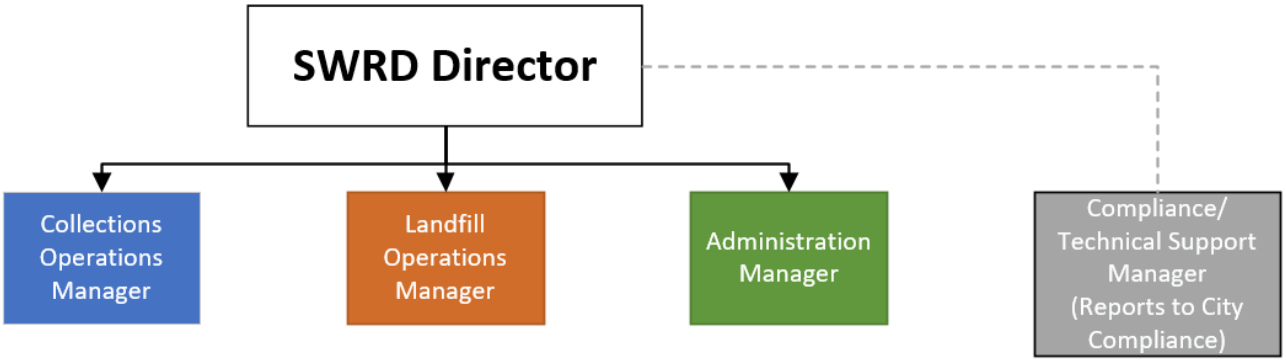
Director

The SWRD Director currently has 4 direct reporting managers:

- Landfill Operations Manager
- Collections Operations Manager
- Administration Manager
- Site Operation and Planning Manager

Based on our on-site discussions and understanding of future SWRD operations, we do not see special projects and new operational processes being implemented on the scale or frequency they have in the past. This reduces the scope of Site Operation and Planning Manager role, which we recommend moving under the direct oversight of the Landfill Operations Manager, rather than the SWRD Director. In addition, the employees that previously reported to the Site Operation and Planning Manager are better suited being under the oversight of the Collections, Landfill, or Administration Managers as will be discussed further in this report. Reorganizing the Site Operations and Planning Manager role would streamline the communication and reporting structure to the SWRD Director and eliminate a redundant level of management personnel.

While the Compliance/Technical Support Manager does not report directly to the SWRD Director, open and constant communication is required between the two. To acknowledge the importance of this relationship we have included this in the organizational chart, but with a dashed line.



Collections

CDC has a staff of 70 employees; 84% are directly involved with the collection operation. Management accounts for 16% of CDC staff.

Collection Staff By Category*		
Staff Category	**Staff**	**Percentage**
Drivers	39	56%
Helpers	6	9%
Relief	10	14%
Container Delivery	3	4%
Welders	1	1%
Total Front Line	59	84%
Management	11	16%
Total Collections	**70**	**100%**

*Percentages may not add to 100 due to rounding.

Management

The operations manager is responsible for the day-to-day operation, planning, and budgeting for CDC. There is a residential manager and a commercial manager and eight supervisors, four each for residential and commercial collections. Each residential supervisor has nine staff and commercial supervisors have six staff.

Supervisors

The supervisors job description is very broad with latitude for assigning duties. The job description recommends that supervisors spend 30% of their time working in the field with crews. This is very low percentage of field work based on industry standards. Supervisors should spend 60 to 70 percent of their time in the field working with crews to ensure safe and productive work practices, and good customer service.

We interviewed many of the supervisors. They spend an inordinate amount of time in the office entering data and tracking just about everything related to the operation. Much of their office work can be handled by administrative staff.

The supervisors take a team approach to supervision. Each driver is assigned to a supervisor for administrative matters, like vacation, sick leave, pay, etc. However, all drivers can contact any supervisor for operations matters, accidents, customer issues, and route issues. Any supervisor can direct a driver for work activities. The drivers' first contact is supervisor Ramon Rodriguez if they can't report to work and for truck issues. If he's not available, they go down the list until they find a supervisor who is available. For all other issues, they contact any supervisor that answers the phone.

This supervisory team approach can be chaotic and frustrating for drivers as wells as supervisors. Drivers have complained that communicating with supervisors can be difficult. One driver reported that a supervisor told him to remain with his truck when it broke down. The driver received a call from a second supervisor who said someone was

on the way to pick him up and bring him to the yard to get a different truck. Principles of supervision recommend that a worker should only report to one supervisor. This improves communications, accountability, and performance.

Here is a partial list of the supervisors' secondary duties:

- Track and enter data for pre/post-trip reports including mileage, tonnage, and fuel;
- Order and maintaining container inventory;
- Order, distribute, and track uniforms and PPE;
- Track accidents and injuries;
- Liaison between drivers and maintenance;
- Correct customer service errors;
- Track cart hangers and enter data into customer accounts;
- Post the drivers' service notes to customer accounts,
- Route residential and commercial routes;
- Add new housing developments that are not on the map.

Another drain on the supervisors' time is the procedure they use to respond to a customer service issues. Supervisors respond in twos when there is a customer complaint. The second supervisor is there to corroborate what the customer and the other supervisor discussed in case there is any future issues. This definitely is not an industry-standard. Only one supervisor should respond to a customer inquiry unless it's a serious situation.

Span of Control

Each residential supervisor has 9 direct reports, including a share of the relief drivers. Commercial supervisors have 6 direct reports, also including a share of the relief drivers. Normally relief drivers are not included in a supervisor's headcount because either the regular driver is working, or a relief driver is taking his place. Thus, the supervisor's headcount doesn't change.

A supervisor managing six to nine drivers is 30 to 50 percent below the industry standard. BRS conducted a study several years ago that showed supervisors manage between 9 and 18 routes with a slightly higher headcount due to a few two-person crews. Relief drivers were not part of the supervisors' headcount. We updated the report for this engagement and found that the span of control was about the same with two exceptions, one company reported supervisors with 20 routes; another company reported supervisors with 25 routes.

The companies we spoke with cited improved communication devices, computers in the supervisors' vehicles, and GPS as reasons for the large span of control. Some of those interviewed also mentioned putting computers in collection trucks allowed supervisors to manage more drivers.

Collections Reorganization

CDC has 3 managers and 8 supervisors, which constitutes 16% of the staff. The industry standard targets management staff at around 10%. BRS makes the following recommendations to bring the CDC management staff percentage in line with the industry standard (see accompanying organizational chart): Reduce the number of managers from 3 to 1 and reduce the number of supervisors from 8 to 5. This is a 66% reduction in managers and a 37% reduction in supervisors, a 54% overall reduction in management. The reorganization puts the supervisors' span of control between 11 and 12 routes with a headcount of 13 to 14, well within the industry standard.

Number of Staff by Category*				
	Current		Reorganization	
Category	Staff	Percent	Staff	Percent
Drivers	39	54%	39	57%
Helpers	6	8%	6	9%
Relief	10	14%	10	15%
Container Delivery	3	4%	3	4%
Welders	1	1%	1	1%
Total Front Line	59	82%	59	87%
Administrative	0	3%	2	3%
Management	11	15%	7	10%
Total	**72**	**100%**	**68**	**100%**

*Percentages may not add up to 100 due to rounding.

New Positions

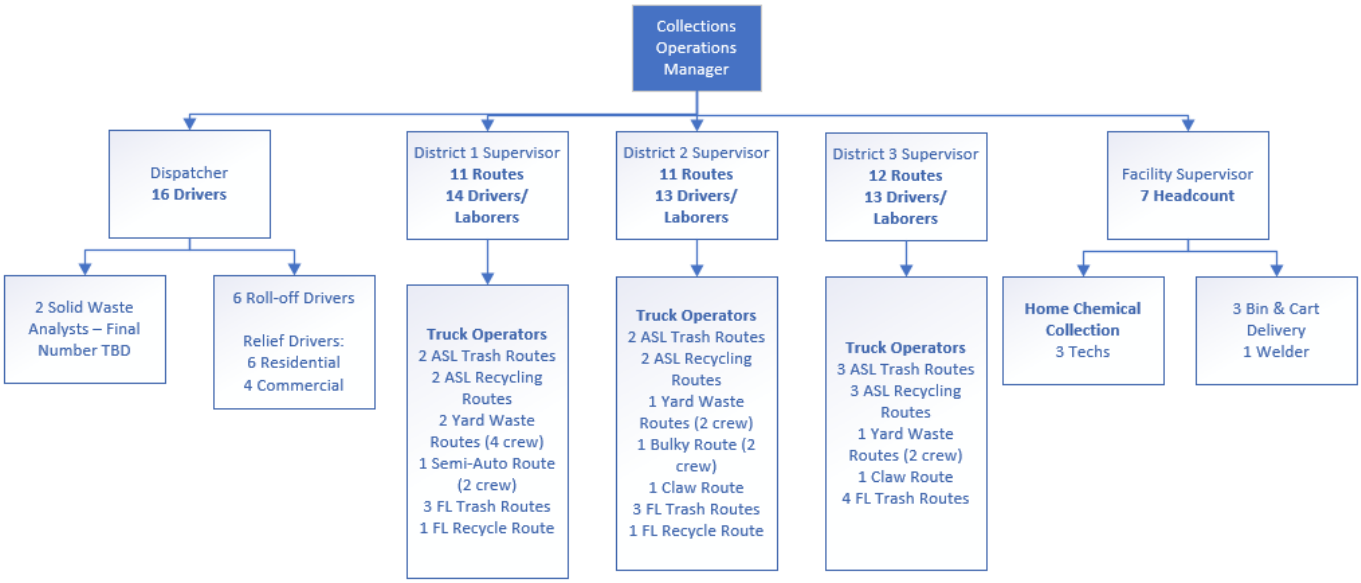
The reorganization includes two new supervisory positions, a dispatcher/supervisor and a facilities supervisor without increasing head count. The reorganization also includes moving two solid waste analysts from the site operation and planning manager to the new dispatcher/supervisor position. These solid waste analysts will assume the administrative and data entry duties from the supervisors along with other duties to be assigned.

Dispatcher/Supervisor: This position has a staff of 10 relief drivers, 6 recycling drivers, and 2 solid waste analysts. Once the relief drivers are dispatched, they become the responsibility of the supervisor for whom they work. After the roll-off drivers are dispatched, any issue that arises in the field would be handled by the supervisor in the area.

It's been our experience that roll-off drivers as a group require little supervision. First, they are usually the more senior, experienced drivers. Second, they only interact with customers a few times a day compared to a front-loader driver who might have 125 customer interactions or a residential driver who may have up to 1,000 customer interactions a day.

The Dispatcher/Supervisor would also be the liaison for the Fleet Services Department, in addition to supervising the solid waste analysts. This position could also become the liaison with the Customer Service Department, a suggestion they made when we met with them during our site visit.

Facilities Supervisor: The Facilities Supervisor position has a staff of 7. The position would be responsible for household chemical collection and container delivery, inventory, and repair, including roll-off boxes and compactors. In addition, the position would be responsible for ordering, inventory, and distribution of all PPE and supplies for the drivers and other duties as assigned. This position would take over when the Dispatch/Supervisor finishes his shift.



Landfill

At the time of our on-site visit, the CDL currently had a staff of 15, with 11 frontline employees being overseen by 4 management level employees. This meant that management accounted for 26% of the landfill staff.

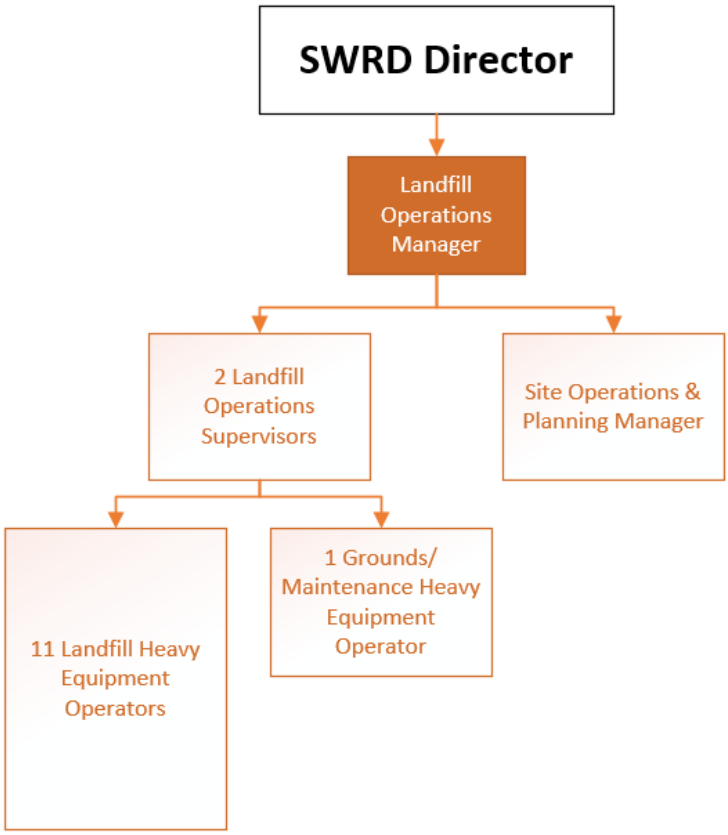
Management

There are currently 2 levels of management between the Landfill Operations Manager and frontline landfill employees: Landfill Manager and Field Services Supervisor. To bring staffing closer to industry standards, we recommend that the Landfill Manager position be dissolved. The Landfill Operations Manager should be responsible for managing all landfill operations, without a redundant manager position. Daily landfill oversight should be supported by 2 Landfill Operations Supervisors.

As previously mentioned, we recommend that the Site Operation and Planning Manager be moved under the oversight of the Landfill Operations Manager. Based on our on-site discussions and understanding of future CDL operations, we do not see special projects and new operational processes being implemented on the scale or frequency they have in the past. This reduces the historical need for the additional Project and CIP Administrator role that previously reported to the Site Operations and Planning Manager. We recommend that the Project and CIP Administrator position be dissolved. One skilled employee, proficient in project management and business analysis, should be appointed as Site Operations and Planning Manager, and as needed, perform the duties previously part of the Project and CIP Administrator role. There is no need for this individual have a pool of employees reporting directly to them. If the Site Operations and Planning Manager needs employees for a specific project, the Landfill Operations Manager should temporarily assign individuals to help with the special project.

Supervisors

We recommend that the 2 Landfill Operations Supervisors have staggered scheduling to cover all lunches and the full 6-day per week landfill operation. These supervisors should provide the direct oversight of daily operations and all frontline landfill employees. This should include those previously stationed at the BMR, and the Grounds/Maintenance Heavy Equipment Operator that was previous under the Project and CIP Administrator. There are currently 12 frontline employees that should report to the 2 supervisors, giving an oversight ratio of 6 employees: 1 supervisor.

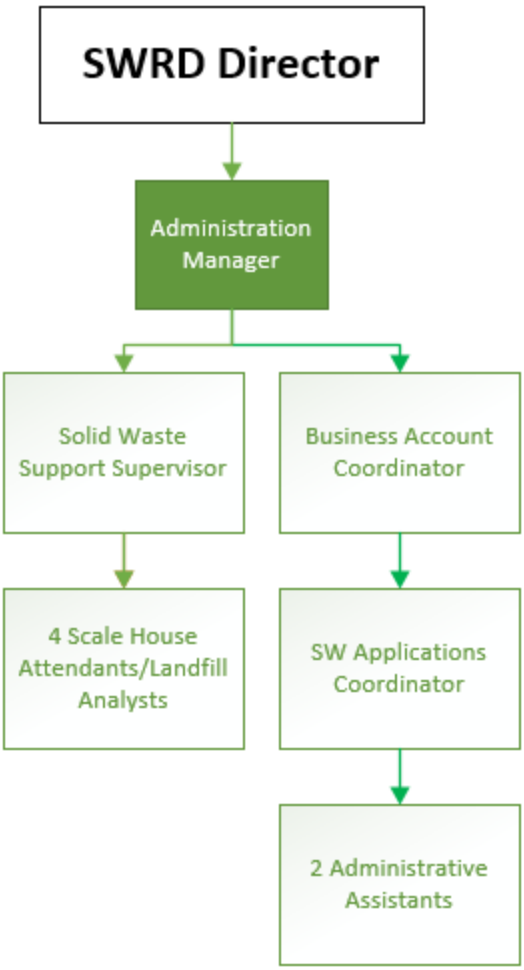


Currently, all frontline landfill and BMR employees are in the Heavy Equipment Operator II classification. In our review however, it did not appear that all these employees actually operate equipment. We recommend that SWRD review the employee classification structure, and re-designate roles as appropriate. This may include laborers, Heavy Equipment Operator I, etc. If a review of employee classifications reveals more Heavy Equipment Operators than warranted for operation, we recommend that these positions be eliminated through attrition.

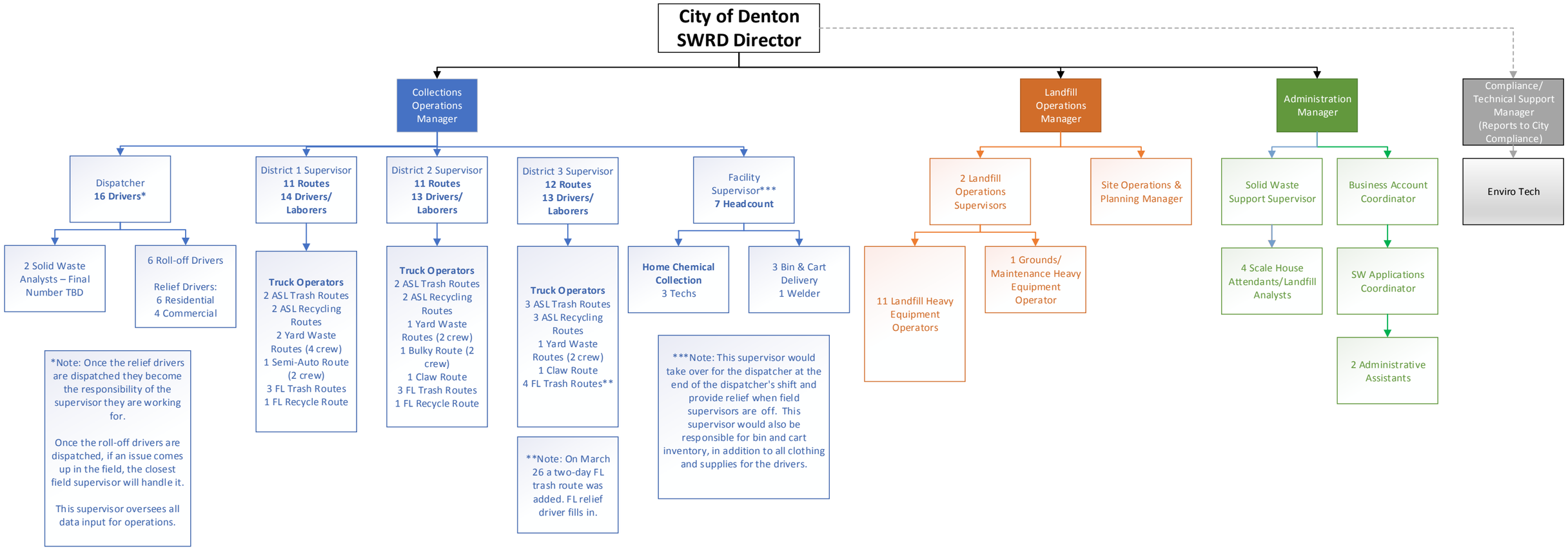
Administration

While our review was focused on operations staff, those recommendations have impact on the Administration organizational structure as well.

We recommend that the Solid Waste Support Supervisor that is currently under the Site Operation and Planning Manager, instead report to the Administration Manager. Our understanding is that the Solid Waste Support Supervisor oversees the landfill scale house operation and 6 Solid Waste Analysts, who either operate the scale house or perform landfill data analysis. We recommend moving 2 of these Analysts to Collections, supporting the new Dispatcher role that was previously recommended. The remaining 4 analysts should be able to adequately provide coverage for the scale house and any additional analytical tasks.


SWRD Director
Administration Manager
Solid Waste Support Supervisor
Business Account Coordinator
4 Scale House Attendants/Landfill Analysts
SW Applications Coordinator
2 Administrative Assistants

Appendix A – Recommended Organizational Chart



Note: For improved legibility when printing, this page has been formatted to 11" x 17" margins.

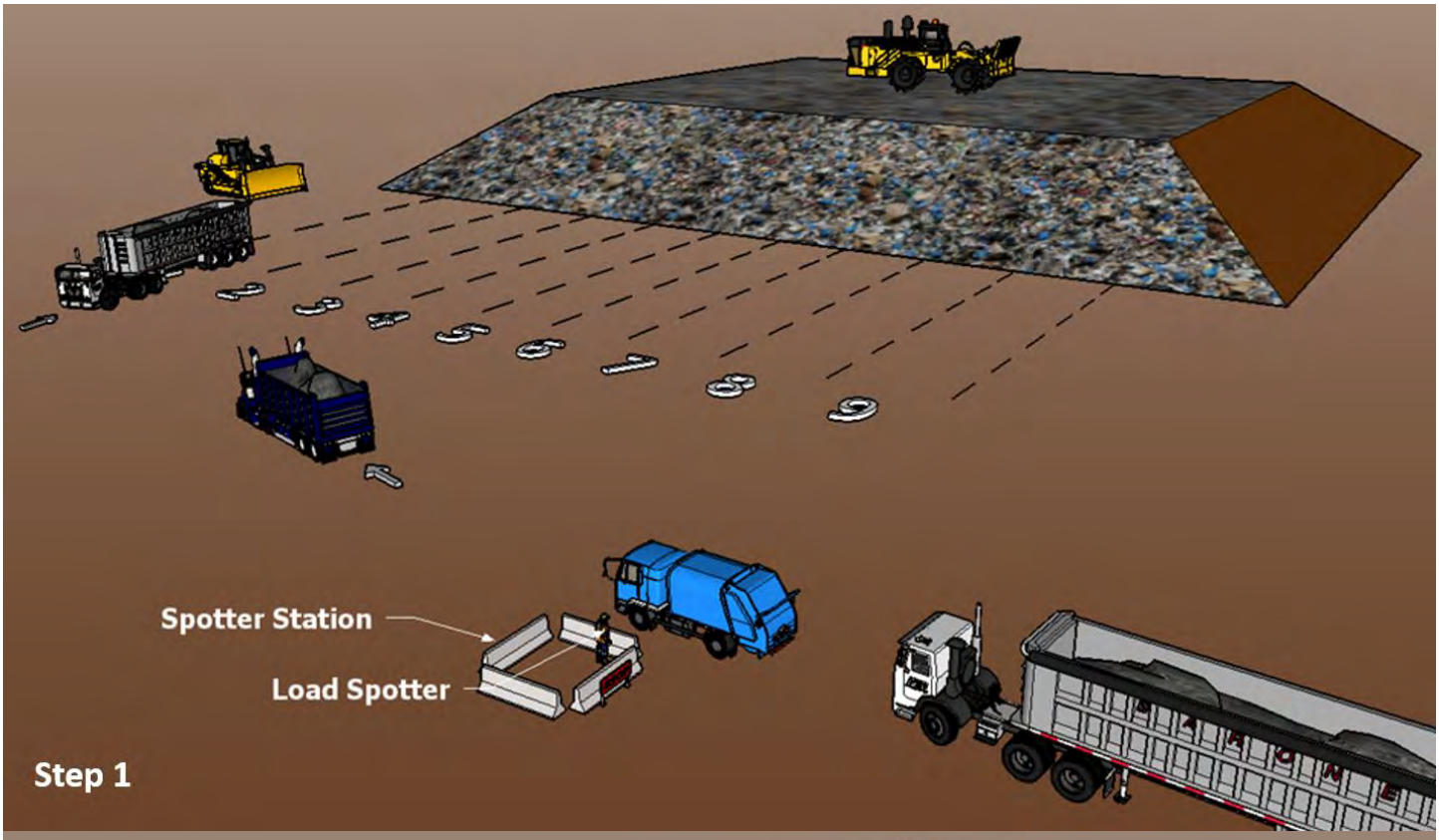
Appendix B – Heaviest Loads

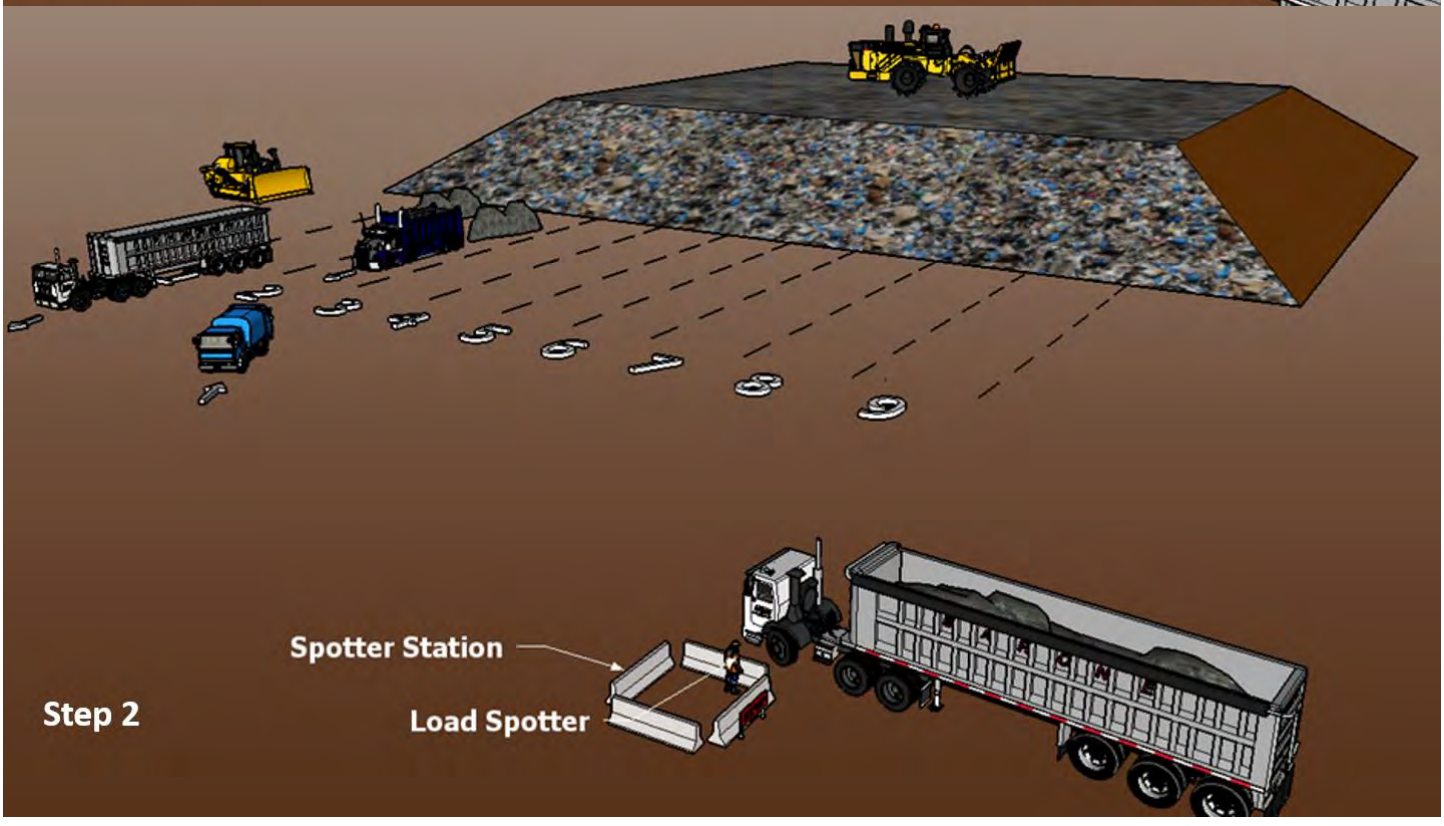
Top 10 Heaviest Residential Loads						
Transaction Number	Route	Truck	Date	Gross TN	Gross Pounds	Pounds >MGVW
860146	Not Specified	1443	8/3/2017	49.57	99,140	33,140
906336	Not Specified	1443	1/17/2018	45.24	90,480	24,480
869029	Not Specified	1674	9/1/2017	43.50	87,000	21,000
872861	Not Specified	1598	9/14/2017	41.74	83,480	17,480
640559	223	671	6/1/2015	37.51	75,020	9,020
634888	1402	1156	5/6/2015	34.18	68,360	2,360
735634	1603	1598	6/3/2016	34.02	68,040	2,040
851878	1207	15101	7/10/2017	33.94	67,880	1,880
640274	1603	1598	5/29/2015	33.80	67,600	1,600
688562	1606	1599	11/27/2015	33.47	66,940	940

Top 10 Heaviest Front-loader Loads						
Transaction Number	Route	Truck	Date	Gross TN	Gross Pounds	Pounds > MGVW
635663	226	1380	5/11/2015	52.40	104,800	38,800
630625	Not Specified	670	4/17/2015	46.18	92,360	26,360
879867	Not Specified	1055	10/9/2017	45.82	91,640	25,640
764263	Not Specified	1248	9/6/2016	45.20	90,400	24,400
895023	Not Specified	1249	11/29/2017	43.50	87,000	21,000
635532	224	1248	5/11/2015	41.54	83,080	17,080
632018	268	671	4/24/2015	41.10	82,200	16,200
688580	279	977	11/28/2015	40.99	81,980	15,980
915350	243	1678	2/21/2018	40.87	81,740	15,740
635582	224	1248	5/11/2015	40.50	81,000	15,000

Top 10 Heaviest Roll-Off Loads					
Transaction Number	**Truck**	**Date**	**Gross TN**	**Gross Pounds**	**Pounds > MGVW**
898248	14100	12/12/2017	44.44	88,880	**22,880**
677472	870	10/13/2015	42.18	84,360	**18,360**
905148	14100	1/11/2018	41.49	82,980	**16,980**
677493	870	10/13/2015	41.03	82,060	**16,060**
670769	14100	9/16/2015	40.13	80,260	**14,260**
644736	1054	6/11/2015	40.08	80,160	**14,160**
683329	1440	11/5/2015	40.01	80,020	**14,020**
858151	1680	7/28/2017	39.89	79,780	**13,780**
790555	1440	12/12/2016	39.60	79,200	**13,200**
874496	870	9/20/2017	39.53	79,060	**13,060**

Appendix C – Typewriter Dumping Pattern


Spotter Station
Load Spotter
Step 1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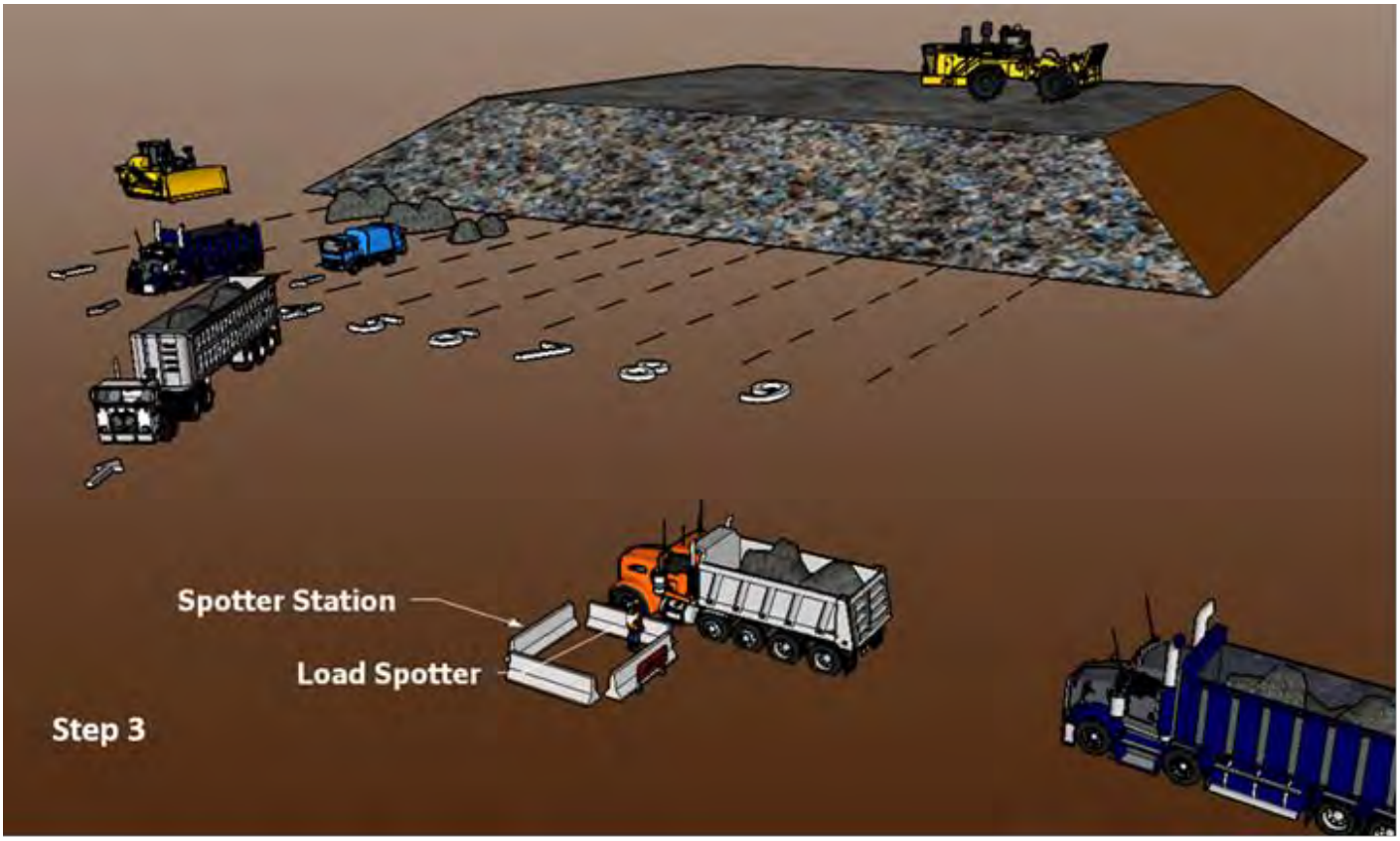
Step 2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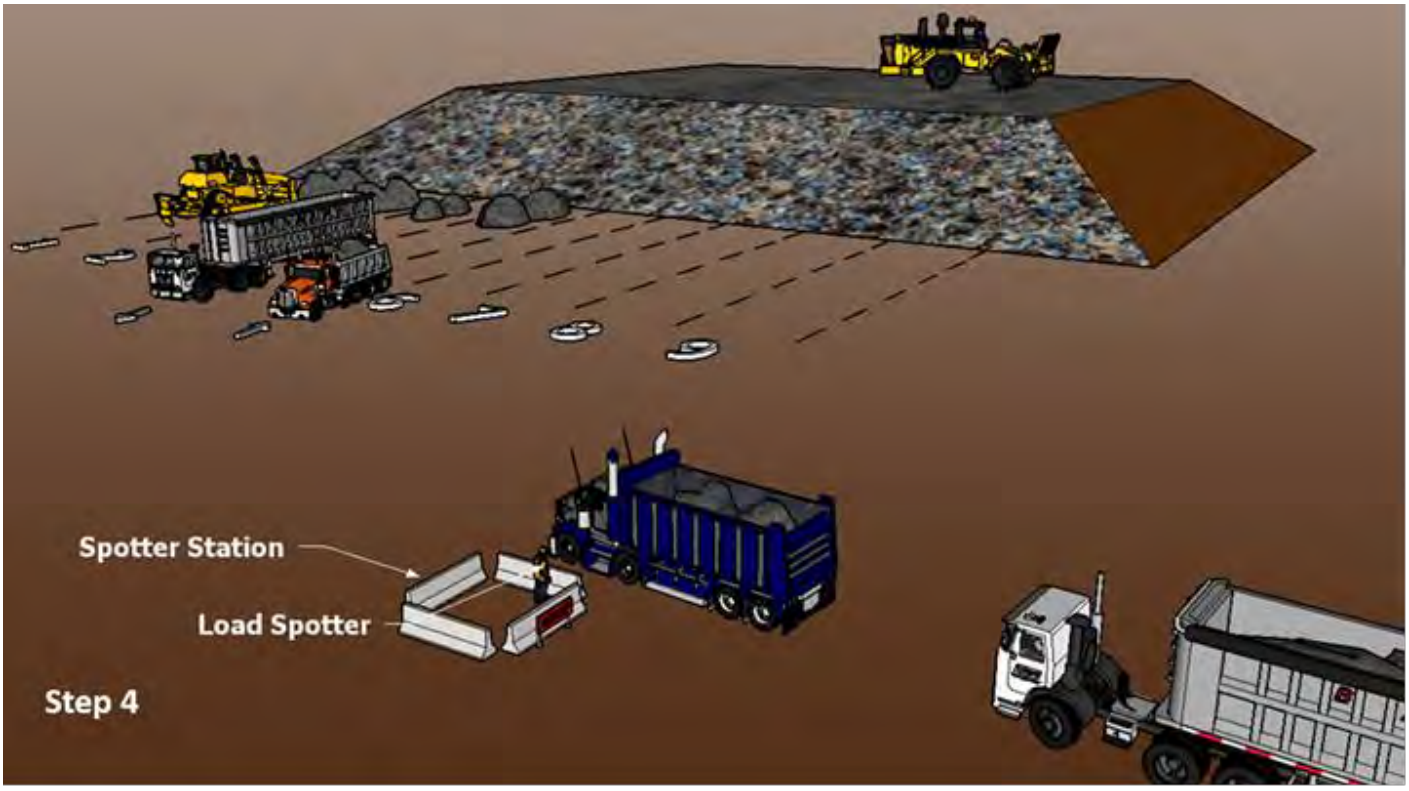
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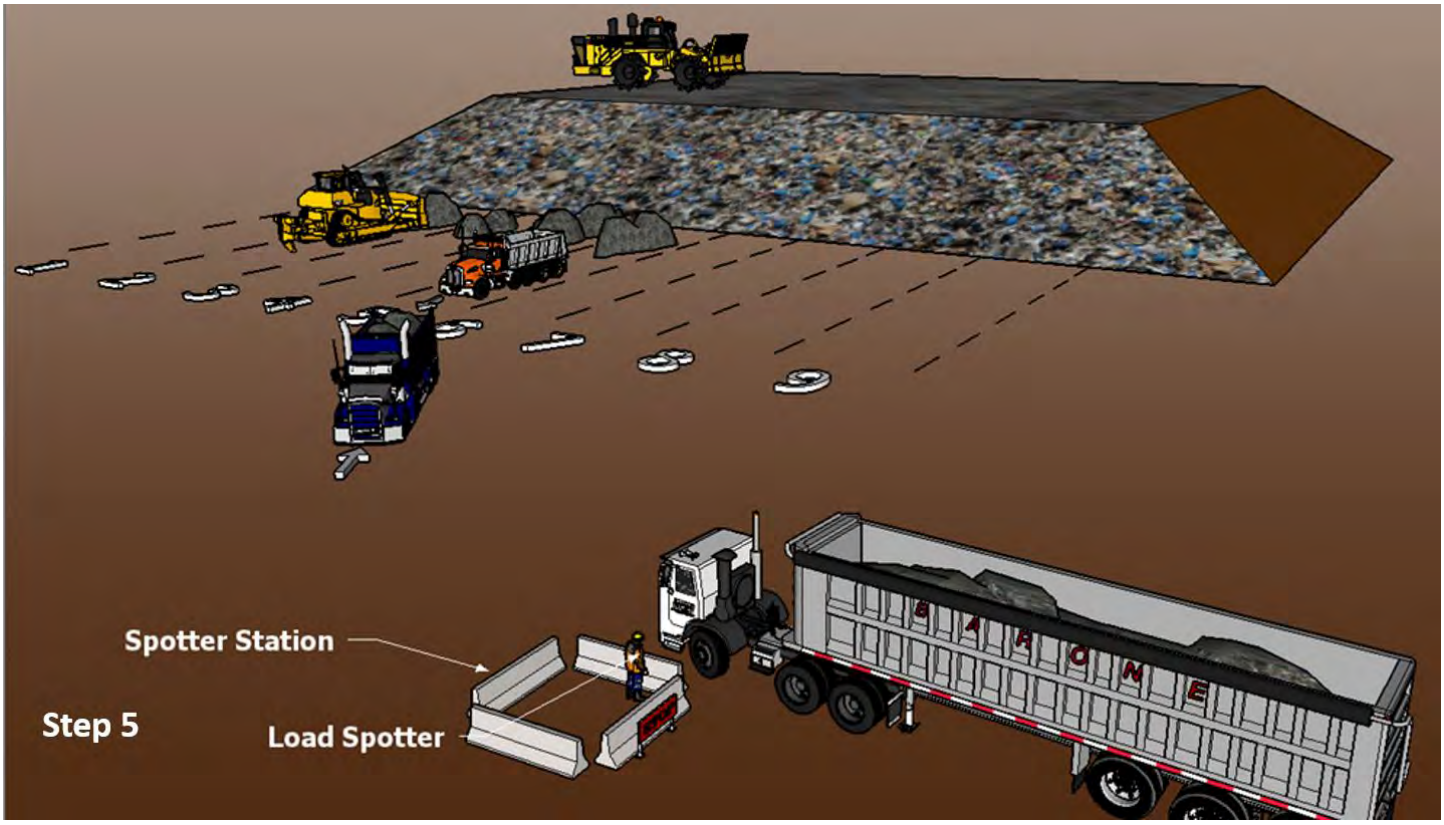
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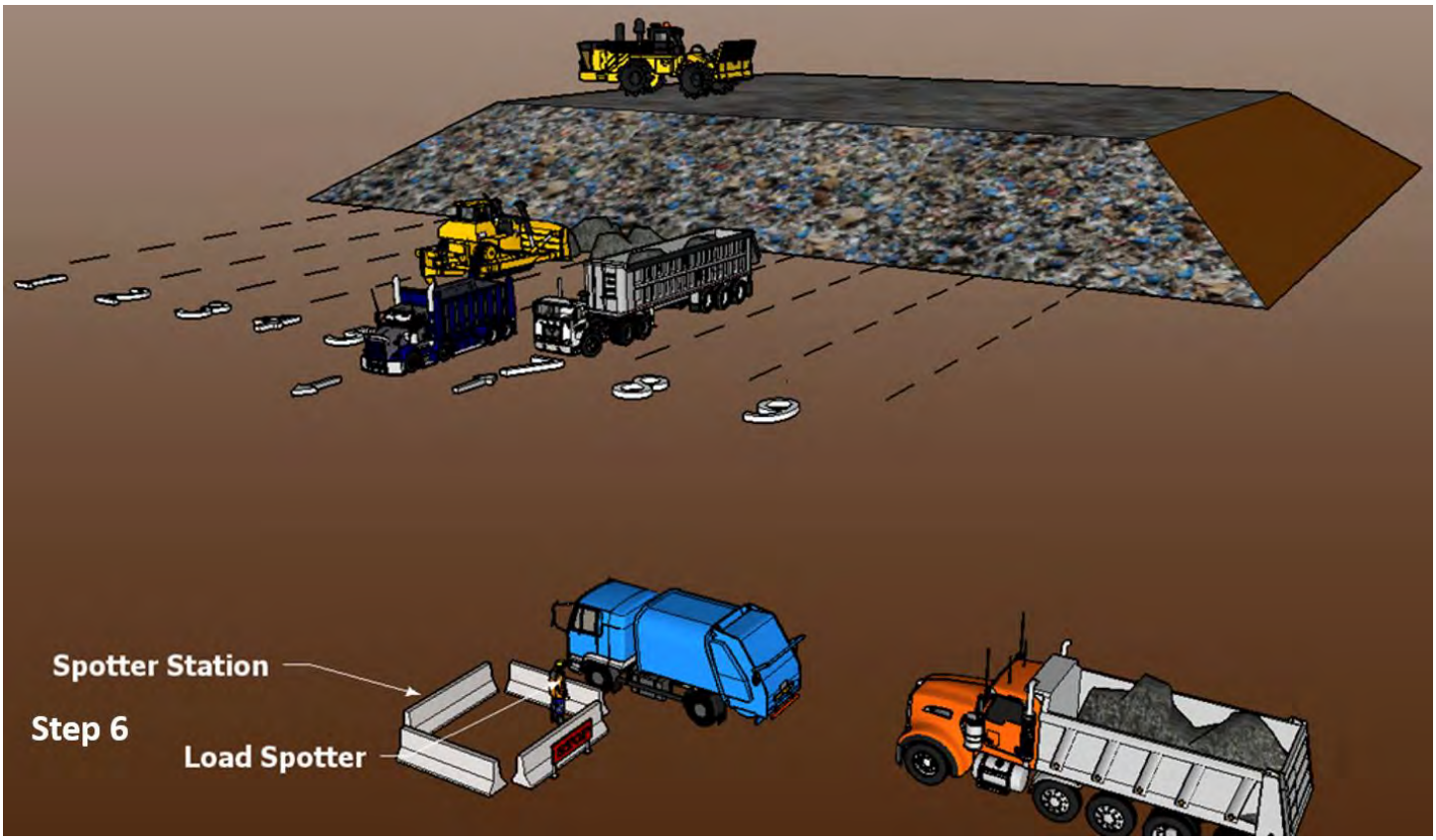
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Step 6
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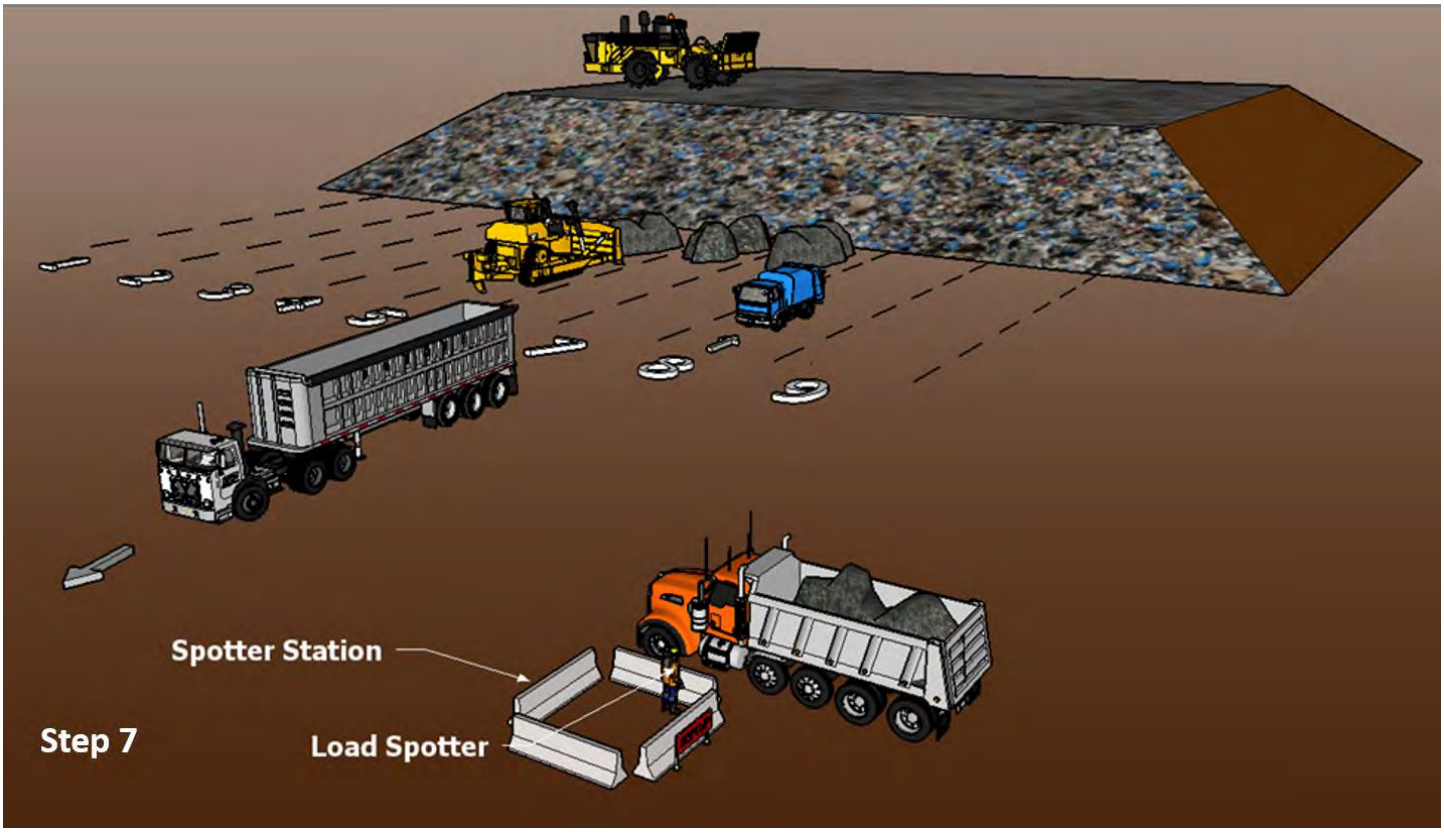
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Step 7
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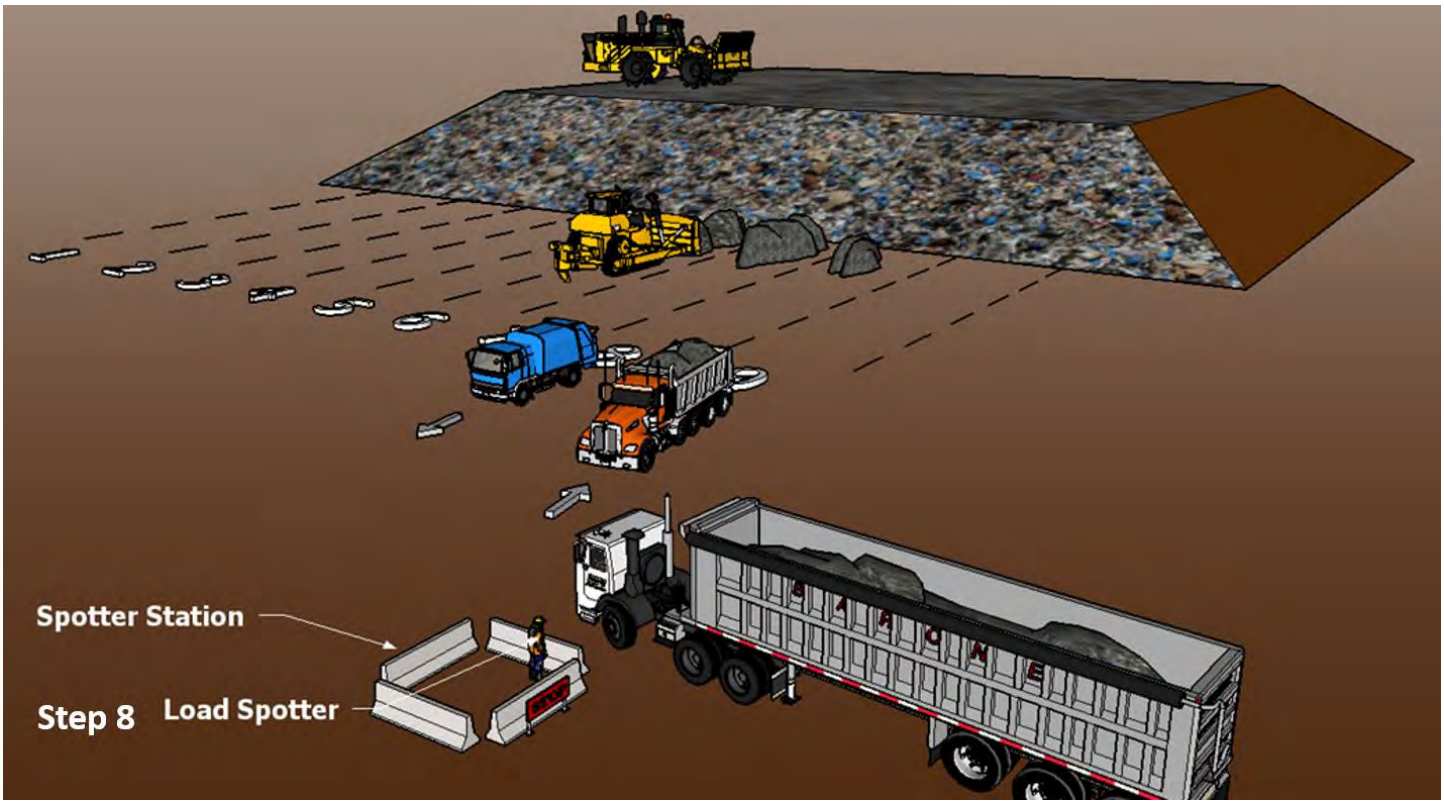
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Step 8
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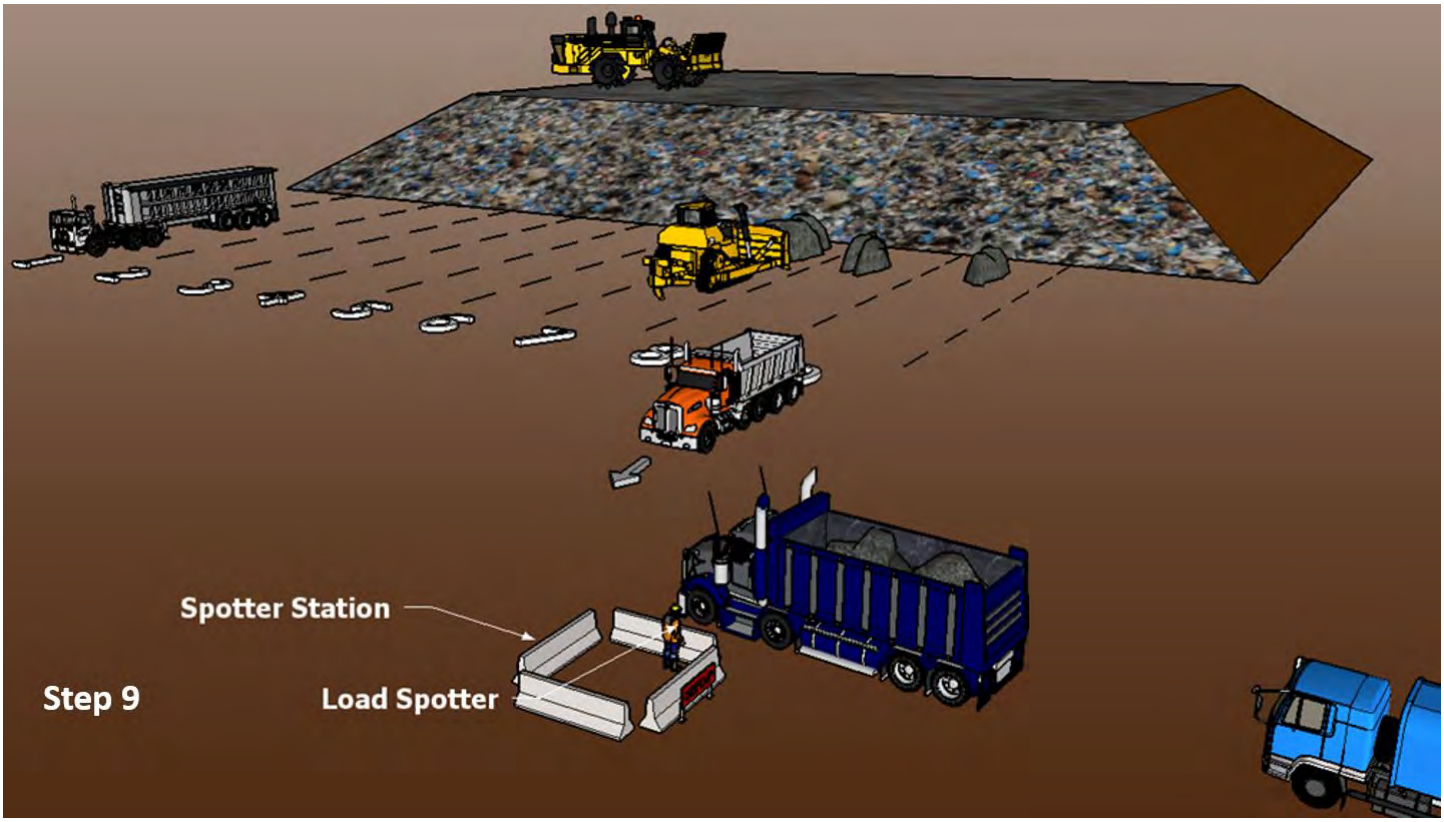
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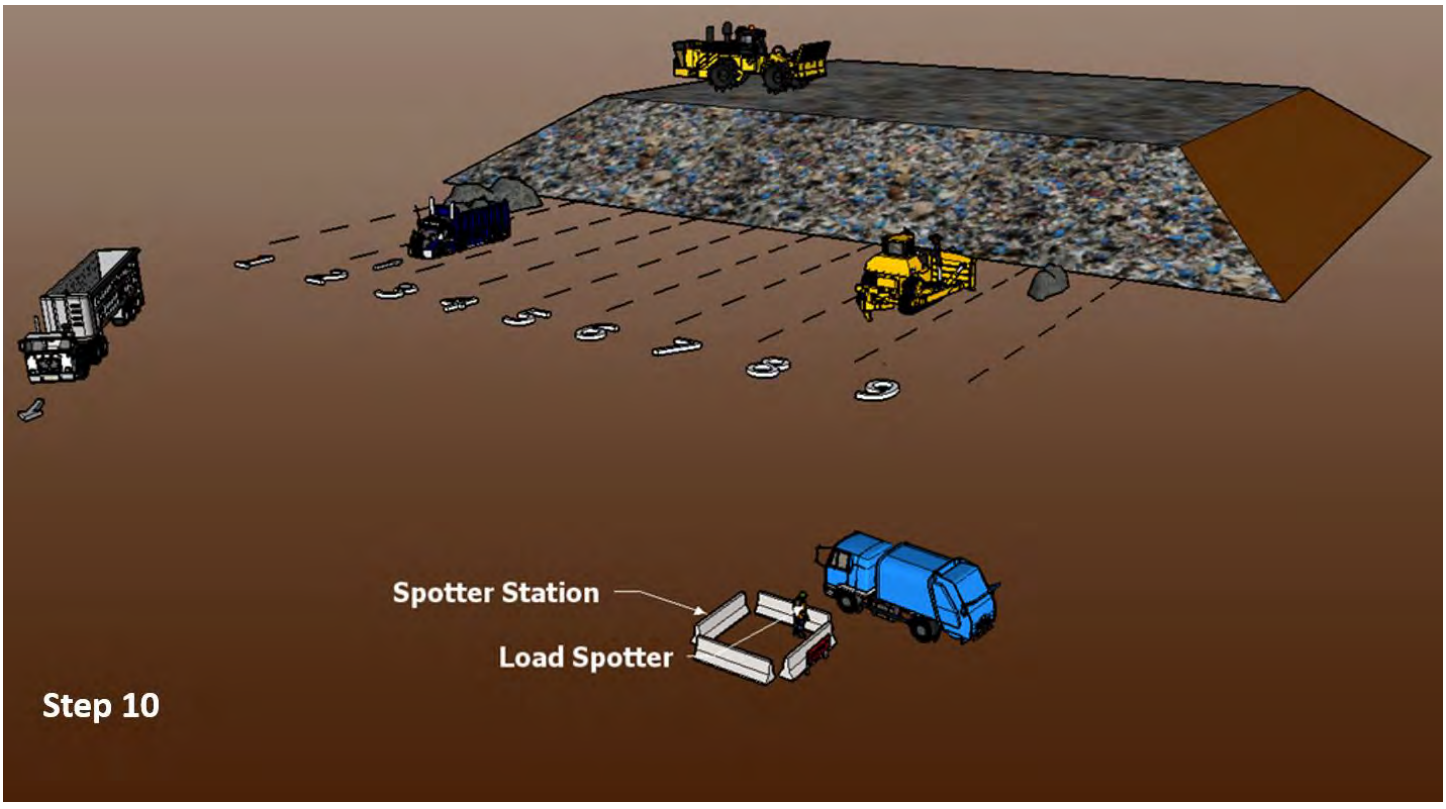
Step 9


Spotter Station
Load Spotter
Step 10


Spotter Station
Load Spotter

Revision Date
06/22/18

Council Requests for Information

Request	Request Date	Staff Responsible	Status
1. Information on cost determination for curb rate vs drop-off rate at landfill	6/5/17	Cox	Consultant has been hired and started work on a cost of service study. A presentation to Council is expected in July.
2. Search for "smoking" in Code of Ordinances and ensure consistency with new ordinance (look at 22.31(13) and 22.31(1))	4/17/18	Rosendahl	An ordinance is being prepared for June 26 Council meeting.
3. TWU master plan and how trees are impacted; Can trees be saved and protected; next steps	5/1/18	McDonald	TWU will give a brief presentation on their Master Plan during the August 21 work session.
4. ISR on leaf trucks (potential use and budget)	5/8/18	Cox	Staff is researching and expect to have an ISR prepared by June 29.
5. Work session on downtown and homelessness, review of options to address shortfall of emergency housing before winter comes, set numerical goals and timing targets.	3/20/18 and 5/15/18	Kuechler/Shaw	A work session is scheduled for July 17.
6. Work session on proposed permitting processes for businesses under the new DDC. Benchmark against other similar cities such as Carrollton or McKinney.	5/15/18	McDonald	Staff is developing an ISR report which will be included in a future Friday report.
7. Work session on Council appointed ad hoc committees and adherence to TOMA	5/22/18	Leal	A work session is planned for July 17.
8. Work session focused on downtown development to include an update on downtown master plan, a complementary master plan for PEC 4 area, and an overview of current uses of the Downtown Reinvestment Grant Fund and potentially expanding uses of this fund status.	6/4/18	Booth/Puente/McDonald	A work session is planned for July 17.
9. Information on what electric rates would be if we did not have the DEC and how the DEC impacts rates	6/4/18	Morrow/Puente	Staff will be providing this information in late June or early July.
10. Information on the Southlake Program for the Improvement of Neighborhoods (SPIN) and how a similar program could be implemented in Denton.	6/12/18	McDonald/Birdseye	ISR is included in the June 22 report.
11. Work session on the status of Quiet Zone establishment.	6/12/18	Deshmukh/Nelson	ISR was included in the June 15 Friday report. A work session is scheduled for August 14.

Request	Request Date	Staff Responsible	Status
12. Information on the current provision of Wi-Fi in Recreation Centers. If Wi-Fi is currently not provided, provide a plan and costs associated with installing Wi-Fi. Provide feasibility of making technology available for youth to use at Recreation Centers during after school hours, potential partnership with the Library.	6/12/18	Kraft/Packan/Bekker	Information is provided in the June 22 Friday report.
13. ISR on sales tax including allowable uses of our 1%, options for the transportation %, and property tax relief.	6/12/18	Puente	Staff is researching and expect to have an ISR prepared by June 29.
14. Work Session about the Employ to Empower program including an overview of successes from other communities and how this initiative could be enhanced in Denton.	6/19/18	Kuechler/Shaw	ISR is being prepared and a work session is scheduled for August 7.
15. Provide an update on the reverse angle parking pilot on Hickory including enforcement measures for vehicles that park incorrectly. Revisit safety measures that were initially considered to ensure they are being enforced.	6/19/18	Deshmukh/Howell	Information will be provided in the June 29 Friday report.
16. Information on strategies to improve traffic flow at I-35 and University Drive near Rayzor Ranch including potential options to address and beautify the abandoned right turn lane on the southwest corner of the intersection.	6/19/18	Deshmukh/Estes	Information will be provided in the June 29 Friday report.
17. Create a citizen engagement page on the City's website that provides information on how residents can become involved in local government and contact elected officials.	6/19/18	Rogers	Information will be provided in the June 29 Friday report.
18. Information on the requirements for securing construction sites of substandard buildings.	6/19/18	McDonald/Lahart	Information is provided in the June 22 Friday report.
19. Include information in the August Gas Well Inspection Annual Report work session regarding safe distances to live from a gas well. Provide a review of density bonuses or other incentives that could be granted to developers for setbacks.	6/19/18	Banks/Leal	A work session is scheduled for August 6 luncheon.
20. Identify a central location on the website for residents to find contact information for members of Boards & Commissions.	6/19/18	Rogers	Staff is researching options and will include information in a future Friday report.

June 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 11:00 Development Code Review	2
3	4 11:00am Council Luncheon 1:30pm Committee on the Environment 5:30pm Traffic Safety Commission Park Board 6 pm	5 10:30am Committee on Citizen Engagement 12:00pm CC Work Session 6:30pm CC Regular Session	6	7 4 p.m. Public Art Committee	8 Cancelled 11:00 Development Code Review	9
10	11 9:00am Public Utilities Board 5:30pm HLC	12 11:00am 2nd Tuesday Session	13 11:00am EDP Board 12:00pm Committee on the Environment 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	14	15 Cancelled 1:30pm Development Code Review	16
17	18	19 2:00 pm CC Work Session 6:30 pm CC Regular Session	20 11:30am Mobility Committee- Cancelled	21 HOT Committee 9-12 HaBSCo Meeting Cancelled	22 11:00 Development Code Review	23
24	25 6:00pm Public Utilities Board 4:00 pm ZBA Cancelled	26 10:00am Council Airport Committee Cancelled 11:00 am 4th Tuesday Session	27 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	28	29 11:00 Development Code Review	30

July 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 No Council Luncheon 1:30pm Committee on the Environment-Cancelled 5:30pm Traffic Safety Commission Park Board 6 pm	3 No Council Meeting	4 4th of July - City Holiday	5 4 p.m. Public Art Committee	6 11:00 Development Code Review	7
8	9 9:00am Public Utilities Board 5:30pm HLC	10 No Council Meeting	11 11:00am EDP Board 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	12	13 11:00 Development Code Review	14
15	16	17 2:00 pm CC Work Session 6:30 pm CC Regular Session	18 11:30am Mobility Committee	19 HaBSCo Meeting	20 11:00 Development Code Review	21
22	23 6:00pm Public Utilities Board	24 10:00am Council Airport Committee 2:00 pm 4th Tuesday Session	25 12:00 Downtown TIF 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	26	27 11:00 Development Code Review	28
29	30 4:00 pm ZBA	31 No Council Meeting				

August 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2 8:30 am Council Budget Workshop 4 p.m. Public Art Committee	3	4
5	6 11:30 am Council Luncheon 1:30pm Committee on the Environment 5:30pm Traffic Safety Commission Park Board 6 pm	7 2:00 pm CC Work Session 6:30 pm CC Regular Session	8 11:00am EDP Board 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	9	10	11
12	13 9:00am Public Utilities Board 5:30pm HLC	14 2:00 pm 2nd Tuesday Session	15 11:30am Mobility Committee	16 HaBSCo Meeting	17	18
19	20	21 2:00 pm CC Work Session 6:30 pm CC Regular Session	22 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	23	24	25 8:00am City Council Retreat Location TBD
26	27 6:00pm Public Utilities Board 4:00 pm ZBA	28 10:00am Council Airport Committee 2:00 pm 4th Tuesday Session	29	30	31	

FUTURE CITY COUNCIL ITEMS

Note: This is a working draft of pending Council items and is subject to change without notice.

Meeting Date	Deadlines	Item
July 2 – **No Luncheon**		
July 3 – **No Meeting**		July 4th holiday observed – City Offices closed
July 10 – **No Meeting**		
July 17 – Work/Regular Session	Captions – July 2 Backup – July 13	WS – 2nd Preliminary Budget Discussion WS – Department Budget Presentations WS – Tree discussion WS – Solid Waste Cost of Service WS – Discussion on homelessness WS – RFQ fpr Engineering Services WS/IC – DRC Engineering contract IC – EDP Board nominating committee IC – Approval of Board of Ethics nominations
July 24 – 4th Tuesday Session	Captions – July 9 Backup – July 20	WS – Department Budget Presentations WS – Plan Concept for North Lakes Tennis Center CA – Utility Management Study
July 31 – **No Meeting**		
August 2 – Budget Workshop	Captions – July 16 Backup – July 27	
August 6 – Luncheon	Captions – July 23 Backup – August 2	WS – Department Budget Presentations WS – Gas Well Inspection Annual Report
August 7 – Work/Regular Session	Captions – July 23 Backup – August 3	WS – Department Budget Presentations WS – Budget Workshop WS – Downtown Reinvestment Grant WS – Chamber ED contract WS – Board of Ethics Rules and Procedures
August 14 – 2nd Tuesday Session	Captions – July 30 Backup – August 10	WS – Budget Workshop
August 21 – Work/Regular Session	Captions – August 6 Backup – August 17	WS – Budget Workshop WS – TWU Master Plan discussion IC – Chamber ED contract IC – EDP Board nominations
August 28 – 4th Tuesday Session	Captions – August 13 Backup – August 24	WS – Budget Workshop IC – Approval of Board of Ethics Rules and Procedures PH – 1st Public Hearing on the Tax Rate
September 3 – **No Luncheon**		Labor Day holiday

CA-Consent Agenda IC-Individual Consideration WS-Work Session
CM-Closed Meeting PH-Public Hearing

Meeting Date	Deadlines	Item
September 4 – **No Meeting**		
September 11–Special Called Work/Regular Session	Captions – August 27 Backup – September 7	WS – Budget Workshop PH – 2nd Public Hearing on the Tax Rate PH – Public Hearing on the Budget
September 18 – Work/Regular Session	Captions – August 31 Backup – September 14	WS – Budget Workshop IC – Adoption of Budget
September 25 – 4th Tuesday Session	Captions – September 10 Backup – September 21	ICMA – 9/22-26, Baltimore
October 1 – Luncheon	Captions – September 17 Backup – September 27	Joint DISD luncheon
October 2 – **No Meeting**		National Night Out
October 9 – 2nd Tuesday Meeting	Captions – September 24 Backup – October 5	TML, Fort Worth, 10/9-10/12
October 16 – Work/Regular Session	Captions – October 1 Backup – October 12	
October 23 – 4th Tuesday Session	Captions – October 8 Backup – October 19	WS – Stoke annual report
October 30 – **No Meeting**		
November 5 – Luncheon	Captions – October 22 Backup – November 1	Airport Update – meeting at Airport
November 6 – Work/Regular Session	Captions – October 22 Backup – November 2	NLC, Los Angeles, 11/7-11/10 IC – Stoke contract renewal
November 13 – 2nd Tuesday Session	Captions – October 29 Backup – November 9	
November 20 – **No Meeting**		Thanksgiving Holiday observed–City Offices Closed 11/22-23
November 27 – 4th Tuesday Session	Captions – November 12 Backup – November 21	***Tentative-Based on Need***
December 3 – Luncheon	Captions – November 19 Backup – November 29	
December 4 – Work/Regular Session	Captions – November 19 Backup – November 30	
December 11 – 2nd Tuesday Session	Captions – November 26 Backup – December 7	
December 18 – Work/Regular Session	Captions – December 3 Backup – December 14	***Tentative-Based on Need***
December 25 – **No Meeting**		Christmas Holiday observed–City Offices Closed 12/24-25

CA-Consent Agenda
CM-Closed Meeting
IC-Individual Consideration
PH-Public Hearing
WS-Work Session

Construction Projects Report

Week of June 25 - July 01, 2018

CURRENT PROJECTS

See Yellow Highlighted for Major Closures

Street/Intersection	From	To	Proposed Date of Construction	Proposed Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:
Ashcroft Ln.	Cobblestone Row	North Dead End	5/14/18	8/9/18	**Street Reconstruction** *(Temporary Lane Closures)*	Streets	5/4/18	Door Hangers	**(940) 349-7160**
Ave. A	Maple	Eagle	3/19/18	6/30/18	**UNT 2018 Residence Hall Project** *(Temporary Lane Closures)*	Engineering	N/A	Coordinate with UNT	**(940) 349-8910**
Bonnie Brae St.	Roselawn West of UPPRR Line	Vintage	7/1/17	8/30/18	**Street Widening** *(Phase 1)*	Engineering	N/A	Electronic Signs	**(940) 349-8910**
Canterbury Ct.	Hollyhill	I-35	4/9/18	6/29/18	**Drainage Improvements** *(Temporary Lane Closures)*	Drainage	3/26/18	Door Hangers	**940-349-8488**
Capetown Dr.	Desert Willow	Bishop Pine	6/25/18	8/3/18	**Concrete Street Panel Repair** *(Temporary Lane Closures Possible)*	Streets	6/5/18	Door Hangers	**(940) 349-7160**
Cobblestone Row	N. Locust	Evers Pkwy	6/11/18	8/9/18	**Street Reconstruction** (Temporary Lane Closures)	Streets	6/5/18	Door Hangers	**(940) 349-7160**
Edwards Rd.	Camino Real Trl.	Swisher Rd.	6/4/18	9/10/18	**Street Reconstruction** (Temporary Lane Closures)	Streets	5/17/18	HOA Contacted	**(940) 349-7160**
Emery St.	Alice	Coit	6/25/18	8/3/18	**Street Resurfacing** (Temporary Lane Closures)	Streets			**(940) 349-7160**
Fulton St.	Oak	University	6/11/18	11/16/18	**Water Main Construction** *(Street Closure)*	Water			**(940) 349-7181**
Fulton St.			TBD	TBD	**Wastewater**	Wastewater			**(940) 349-7300**

Street/Intersection	From	To	Proposed Date of Construction	Proposed Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:
Fulton St.			TBD	TBD	**Streets**	Streets			**(940) 349-7160**
Hickory St.	North Texas Blvd.	Ave C	5/21/18	8/3/18	**Street Reconstruction** *(Temporary Road Closures)*	Streets	5/15/18	Electronic Signs	**(940) 349-7160**
Highland St.	Carroll	IOOF	6/11/18	7/2/18	**Street Resurfacing, Curb and Gutter** *(Temporary Lane Closures)*	Streets	N/A		**(940) 349-7160**
Holiday Park Phase 2	Manhattan	Kings Row	11/10/17	12/1/18	**Wastewater Main Construction** *(Temporary Lane Closures Possible)*	Wastewater	11/16/18	Door Hangers	**(940) 349-7300**
Hollow Ridge Dr	Paint Dr.	Big Horn Trail	5/14/18	6/29/18	**Concrete Street Panel Repair** *(Temporary Lane Closures Possible)*	Streets	5/3/18	Door Hangers	**(940) 349-7160**
Hollyhill Ln.	Longridge	Pennsylvania	7/9/18	8/24/18	**Street Reconstruction** (Temporary Street Closures)	Streets			**(940) 349-7160**
Huisache St.	Yucca	Retama	5/21/18	7/20/18	**Streets Construction** *(Temporary Lane Closures Possible)*	Streets	5/15/18	Door Hangers	**(940) 349-7160**
Lakeview Blvd.	Black Walnut	Burr Oak	6/18/18	7/13/18	**Concrete Street Panel Repair** *(Temporary Lane Closures Possible)*	Streets	6/5/18	HOA Contacted	**(940) 349-7160**
Linda Ln.	Cobblestone Row	North Dead End	4/23/18	8/9/18	**Street Reconstruction** *(Temporary Lane Closures)*	Streets	4/9/18	Door Hangers	**(940) 349-7160**
Lindsay St.	McCormick	I-35 Service	6/8/18	7/31/18	**Wastewater Main Reconstruction** *(Temporary Lane Closures Possible)*	Wastewater	6/5/18	Door Hangers	**(940) 349-7300**
Malone St.	Crescent	Westchester	6/11/18	7/13/18	**Water Main Construction** (Street Closure)	Water			**(940) 349-7181**
McKinney St.	Loop 288	Ryan H.S	5/29/18	TBD	**Sidewalk Construction** (Temporary Lane Closures)	Engineering	N/A	Electronic Signs	**(940) 349-8910**
Mayhill Rd.	US 380	Edwards	9/1/17	2/1/20	**Street Reconstruction** *(Temporary Road Closures)*	Engineering	1/3/18, 1/24/18	Door Hangers	**(940) 349-8910**
Mills Rd.	Mayhill	Denton ISD driveway	5/29/18	7/30/18	**Water and Wastewater Construction and Road Widening** (Street Closure)	Engineering	N/A	Electronic Signs	**(940) 349-8910**

Street/Intersection	From	To	Proposed Date of Construction	Proposed Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:
Mingo Rd.	Sirius	Mockingbird	6/25/18	7/13/18	**Wastewater Main Construction** *(Road Closure)*	Engineering			**(940) 349-8910**
Montecito Dr.	El Paseo	Seville	6/25/18	7/23/18	**Street Resurfacing** (Temporary Lane Closures)	Streets			**(940) 349-7160**
Paint Dr.	Arabian	Hollow Ridge	6/11/18	7/20/18	**Concrete Street Panel Repair** (Temporary Lane Closures)	Streets	5/25/18	Door Hangers	**(940) 349-7160**
Prominence Pkwy.	Mayhill	Atlanta	1/31/18	8/31/18	**Water and Wastewater Crossing** *(Road Closure)*	Engineering	1/24/18	Door Hangers	**(940) 349-8910**
Retama St.	Sagebrush	Huisache	TBT	TBD	**Streets Construction** *(Temporary Lane Closures Possible)*	Streets	5/15/18	Door Hangers	**(940) 349-7160**
Riney Rd.	N Elm	Solana	9/29/17	9/30/18	**Road Removal and Replacement** *(Road Closure)*	Engineering	Yes	Electronic Signs	**(940) 349-8910**
Roselawn Dr.	Bonnie Brae	Kansas City Southern RR	3/26/18	TBD	**Drainage and Roadway Construction** *(One Lane traffic control)*	Engineering	N/A		**(940) 349-8910**
Sagebrush Dr.	Kings Row	Retama	5/21/18	7/20/18	**Streets Construction** *(Temporary Lane Closures Possible)*	Streets	5/15/18		**(940) 349-7160**
Sena St.	Malone	Ector	4/23/18	7/20/18	**Street Reconstruction** *(Temporary Lane Closures)*	Streets	4/17/18		**(940) 349-7160**
Spencer Rd.	Mayhill	Lowe's Driveway	4/2/18	9/29/18	**Water Line Replacement** *(Road Closure)*	Water	3/16/18	Contacted departments affected	**(940) 349-8910**
Spencer Rd.	Mayhill	Lowe's Driveway	4/2/18	9/29/18	**Drainage Rebuild** *(Road Closure)*	Drainage	3/16/18	Contacted departments affected	**(940) 349-8910**
Spencer Rd.	Mayhill	Lowe's Driveway	4/2/18	9/29/18	**Road Reconstruction** *(Road Closure)*	Engineering	3/16/18	Contacted departments affected	**(940) 349-8910**
Sycamore St.	Sycamore	Wainwright	6/29/18	7/31/18	**Wastewater Main Reconstruction** Temporary Lane Closures	Wastewater			

Street/Intersection	From	To	Proposed Date of Construction	Proposed Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:
Sun Valley Dr.	Stuart	Dead End West	5/14/18	8/6/18	**Street Resurfacing, Curb and Gutter** *(Temporary Lane Closures)*	Streets	5/1/18	Door Hangers	**(940) 349-7160**
Valley View Rd.	Kings Row	Sun Valley	5/14/18	6/29/18	**Street Resurfacing, Curb and Gutter** *(Temporary Lane Closures)*	Streets	5/1/18	Door Hangers	**(940) 349-7160**
Welch St.	Mulberry	Chestnut	4/11/18	6/30/18	**UNT 2018 CVAD Project Drive approach/Sidewalk** *(Temporary Lane Closures)*	Engineering	3/19/18	3/30/2018	**(940) 349-8910**

COMPLETED PROJECTS

Hereford Rd.	Bighorn	Paint	5/7/18	6/8/18	**Concrete Panel Repairs** *(No Detours)*	Streets	4/26/18	Door Hangers	**(940) 349-7160**
Hollyhill Ln.	Pennsylvania Dr.	Longridge	5/9/18	5/31/18	**Wastewater Main Construction** *(Temporary Road Closures Possible)*	Wastewater	N/A	Door Hangers	**940-349-7300**
Market St.	Loop 288 N	Blake	4/16/18	6/1/18	**Street Resurfacing, Curb and Gutter** *(Temporary Lane Closures)*	Streets	4/9/18	Door Hangers	**(940) 349-7160**
Mayhill Rd.	Mayhill NB	Right Turn Lane at McKinney	5/18/18	5/31/18	**Water Line Replacement** (Lane Closure)		N/A		**(940) 349-8910**
Mild Creek Ln.	Rambling Rock	Cul de Sac	4/30/18	6/21/18	**Concrete Panel/Sidewalk Repairs** *No Detours*	Streets	4/26/18	Door Hangers	**(940) 349-7160**
Montecito Dr.	El Paseo	Seville	5/29/18	6/22/18	**Curb and Gutter Repairs** (Temporary Lane Closures)	Streets	N/A		**(940) 349-7160**

UPCOMING PROJECTS

Bonnie Brae St.	US 377	I35W	2018	2020	**Street Widening** *(Phase 2)*	Engineering			**(940) 349-8910**
Bonnie Brae St.	US 377	I35E	2019	2021	**Street Widening** *(Phase 1)*	Engineering			**(940) 349-8910**

Street/Intersection	From	To	Proposed Date of Construction	Proposed Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:
Bonnie Brae St.	TBD	TBD	TBD	TBD	**Street Widening** *(Phase 1)*	Engineering			**(940) 349-8910**
Hettie St.			TBD	TBD	**Water, Wastewater, and Streets**	Multiple			
Hinkle Dr.			TBD	TBD	**Water, Wastewater, Drainage, Streets**	Multiple			
Londonderry Ln.	Teasley	Westminster	9/1/18	TBD	**Street Improvements** *(Temporary Lane Closures)*	Streets			**(940) 349-7160**
Malone St.	Crescent	Westminster	Summer 2018		**Water Main Construction**	Water			**(940) 349-7181**
Panhandle St.	Carroll	Bolivar	TBT	TBT	**Street Resurfacing, Curb and Gutter** *(Temporary Lane Closures)*	Streets	4/9/18	Door Hangers	**(940) 349-7160**
PEC 4 - Engineering			In Design		**Installing Underground Box Culvert**	Engineering			**(940) 349-8910**
Smith-Johnson			Summer 2018		**Water, Wastewater, Drainage, Streets**	Engineering			**(940) 349-8910**
Stuart Rd.	Windsor	Kings Row	TBD	TBD	**Concrete Curb and Gutter Repair** (Temporary Lane Closures)	Streets			**(940) 349-7160**
Thomas St.			TBD	TBD	**Water, Wastewater, and Streets**	Multiple			
W. Walnut St.	S. Elm	Cedar	TBT	TBT	**Utility Construction** *(Temporary Road Closures)*	Engineering	N/A		**(940) 349-8910**
Wayne St.			TBD	TBD	**Water, Wastewater, and Streets**	Multiple			
Windsor Dr.			TBD	TBD	**Water, Wastewater, Drainage, Streets**	Engineering			**(940) 349-8910**