Food Service Establishment Sewer Capacity Charge Determination Study

December 2014

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Executive Summary

The City's Sewer Capacity Charge is a fee collected from applicants whose project will either connect to the City's sewer system or increase the volume of flow contributed to the sewer system. The charge is based on the capital cost of sewer facilities necessary to convey and treat the sewage generated by the project and discharged into the system.

On June 8, 2010, the City updated the Sewer Capacity Charge in its Master Fee Schedule. The update also modified the calculation and factors used to determine food service establishments' (FSE) rates of flow. Since that time, various changes in planned development and reduced flows of approximately 10% due to water conservation efforts have had an impact on the wastewater program. These changes justified review of the sewage flows generated by FSEs and of the calculation and factors used to estimate such flows. Though no modification to the Sewer Capacity Charge per Equivalent Dwelling Unit (EDU) is recommended at this time, a refinement of the methodology used to estimate the sewage generation rate for FSEs is proposed to more accurately reflect actual flow. This modification improves the nexus between the fee charged and the actual flows generated by FSEs. The recommended revisions will result in reduced fee calculations for all FSE categories.

The Wastewater Engineering staff reviewed the process for collecting the Sewer Capacity Charge for FSEs in order to verify that each new restaurant was being charged appropriately for the capacity that they would require within the sanitary system. Each new location is required to pay a capacity fee that represents the projected wastewater discharge to be transported and treated within the wastewater system. This fee is based upon the calculated cost per EDU as part of the City of Chula Vista's Wastewater Collection System Master Plan.

Currently, there is no viable technology that can accurately measure the wastewater discharge per individual FSE. City staff contacted various manufacturers in an attempt to procure wastewater discharge monitoring equipment. The most advanced meters used to monitor flow are not designed for pipes as small as a sewer lateral. In addition, meters require continuous flow in order to properly monitor increases or decreases in flow. As a result of the inability to accurately measure wastewater discharge flows, an analysis was performed to estimate the wastewater generation from a proposed FSE. This analysis assumes that 90% of the metered water an FSE uses will be discharged back into the wastewater system. This assumption is consistent with the 2013 Chula Vista Sewer Cost of Service Rate Study, regional and national industry standards.

The current sewage generation rate for FSEs is divided into two categories: 1) FSEs with 12 seats or less and 2) FSEs with more than 12 seats. For FSEs with 12 seats or less, a generation rate of 1.1 EDUs is applied. For FSEs with more than 12 seats, the EDUs are calculated based on the assumption that each seat generates an average of 25 gallons per day (GPD) of discharge. At the time these rates were calculated, 1 EDU converted to 265 GPD of discharge. This factor was recently reduced to 230 GPD based on the 2014 Wastewater Collection System Master Plan.

After several methodologies were analyzed, the proposed FSE wastewater generation rates below were determined to more accurately estimate future flows for FSEs.

Food Service Establishment Generation Rates*
Category 1 (Fast Food with Drive Thru).....18.8 GPD/seat
Category 2 (Fast Food without Drive Thru) .....21.2 GPD/seat
Category 3 (Buffets).....14.5 GPD/seat
Category 4 (Sit Down with Waiter) .....17.7 GPD/seat
Category 5 (Coffee Shop /Juice Bar) .....19.9 GPD/seat
Category 6 (Bar/Night Club).....7 GPD/seat

*1 EDU=230 GPD

This study recommends that the FSE categories be expanded to the six, as shown above, along with a minimum rate.

An analysis using the minimum fixtures an FSE would need to meet various government codes and requirements resulted in a minimum generation rate equal to 0.6 EDUs. This minimum rate is recommended for all FSEs regardless of number of seats. Therefore, the Sewer Capacity Charge is proposed to be 0.6 EDUs of flow, or the calculated EDUs based on the wastewater generation rate per FSE category, whichever is greater.

Chapter 1
Introduction

Chapter 12 of the Master Fee Schedule includes the City's Sewer Capacity Charge. The Sewer Capacity Charge is paid by the owner or person applying for a permit to develop or modify the use of any residential, commercial, industrial or other property. The purpose of the Sewer Capacity Charge is to pay for the capital costs of facilities needed to serve new customers connecting to the wastewater system. This study outlines an improved means of determining the Sewer Capacity Charge rate structure for food service establishments (FSEs).

The City of San Diego, as part of the Metropolitan Wastewater District (Metro), provides sewage treatment services to fourteen participating agencies that do not own/operate sewage treatment facilities, including Chula Vista The Sewer Capacity Charge is also intended to fund either the construction of treatment facilities or the purchase of additional treatment capacity rights in the City of San Diego's sewer system (METRO). A proper Sewer Capacity Charge secures adequate funding for the wastewater collection system upgrades and treatment facilities needed to accommodate the City's growth.

The Sewer Capacity Charge was established in 1985, and has been regularly updated since that time. With the most recent update occurring in July 2014, the fee is currently set at $3,450 per Equivalent Dwelling Unit (EDU). No modification to the fee per EDU is proposed at this time. Instead, it is proposed that the methodology used to estimate sewer generation rate for FSEs be changed to more accurately reflect actual flow. In turn, with a more accurate generation rate, the fee charged will more reasonably estimate the costs of sewer facilities necessary to serve an applicant's project.

The capacity fee assessed for each project is based upon anticipated discharge into the City's sewer system and varies by land use. In July 2014, City Ordinance 3314 modified the calculation of an Equivalent Fixture Unit (EFU) from 14 to 12.1 gallons of flow per day. This Ordinance also lowered the single family wastewater unit generation rate from 265 to 230 gallons of flow per day (GPD).

The current sewage generation rate for FSEs is divided into two categories: 1) FSEs with 12 seats or less and 2) FSEs with more than 12 seats. For FSEs with 12 seats or less, a generation rate of 1.1 EDUs is applied. For FSEs with more than 12 seats, the EDUs are calculated based on the assumption that each seat generates an average of 25 gallons per day of discharge. At the time these rates were calculated, 1 EDU converted to 265 GPD of discharge. This factor was recently reduced to 230 GPD based on the 2014 Wastewater Collection System Master Plan.

Chapter 2
Background

2.1 ECONOMIC AND LEGAL BASIS FOR CAPACITY FEES

The following section provides a general review of basic economic and legal foundations for capacity fees. Some agencies refer to connection fees as capacity fees, system development charges, impact fees, or other similar names. The City refers to these fees as capacity charges.

Expansion of service to new customers carries with it costs to provide that service. As the number of customers grows, system capacity typically needs to be expanded to provide service to the new customers. Even in those utilities that have available capacity in place that can be used to service new customers, new facilities or capacity will ultimately be required to accommodate growth. Where capacity to accommodate new customers is available in the existing system, there are still costs to be recognized. The manner in which costs are recovered, whether for existing or expanded capacity, depends on a number of technical, policy, and legal issues. These could include equity in distributing the costs among customers, the ease or cost of implementation and administration, and legal requirements or constraints.

The basic economic philosophy behind imposition of capacity fees is that the costs of providing service should be paid for by those customers receiving the benefits of that service so that no one customer or group of customers subsidizes any other customers. In establishing any fee or charge, achieving equity is one of the primary goals. In the case of capacity fees, this goal has been expressed in the form of "growth should pay for growth."

2.2 LEGAL FRAMEWORK GOVERNING CAPACITY FEES

In California, the basic statutory standards governing water and sewer capacity fees are embodied in Government Code Section 66013, 66016, and 66022. Government Code 66013 provides the fundamental provisions:
(a) Notwithstanding any other provisions of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount the fee or charge imposed in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue.
(b) As used in this section
(1) "Sewer connection" means the connection of a building to a public sewer system.
(2) "Water connection" means the connection of a building to a public water system, as defined in subdivision (e) of Section 4010.1 of the Health and Safety Code.

(3) “Capacity charges” means charges for facilities in existence at the time the charge is imposed or charges for new facilities to be constructed in the future which are of benefit to the person or property being charged.
(4) “Local agency” means a local agency as defined in Section 66000.
(c) Any judicial action or proceeding to attack, review, set aside, void, or annul the ordinance, resolution, or motion imposing a fee or capacity charge subject to this section shall be brought pursuant to Section 66022. Section 66013 indicates that any connection fee must be based on an estimate of the reasonable cost of providing service. The legislative history of this provision indicates that the legislature did not intend to limit the types of costs that would be included.
The underlying basis for the legal framework is that any capacity fees imposed should reflect the estimated reasonable cost of providing service to new customers, unless voters have specifically approved a higher level for the fees.

2.3 SEWER CAPACITY CHARGE AND UNIT GENERATION RATE

Chapter 12 of the Master Fee Schedule includes the City’s Sewer Capacity Charge. The Sewer Capacity Charge is paid by the owner or person applying for a permit to develop or modify the use of any residential, commercial, industrial or other property. The purpose of the Sewer Capacity Charge is to pay for the capital costs of facilities needed to serve new customers connecting to the wastewater system. The Sewer Capacity Charge is also intended to fund either the construction of treatment facilities or the purchase of additional treatment capacity rights in the City of San Diego’s sewer system (METRO). A proper Sewer Capacity Charge secures adequate funding for the wastewater collection system upgrades and treatment facilities needed to accommodate the City’s growth.

On July 22, 2014, City Council, by Ordinance No. 3314, lowered the Sewer Capacity Charge from $3,478 to $3,450 per Equivalent Dwelling Unit (EDU). The City also lowered the single family wastewater unit generation rate from 265 to 230 gallons per day (GPD) based on the recently adopted Wastewater Collection System Master Plan findings. The Sewer Capacity Charge per EDU and single family unit generation rate are not proposed to be modified at this time.

Chapter 3
Methodology

3.1 RATE OF RETURN FOR COMMERCIAL CUSTOMERS

On December 2013, the City Council adopted the Sewer Cost of Service Rate Study which estimated sewer flows based on actual water usage for commercial users which includes FSE customers. The water usage is then adjusted downward to account for consumptive water usage that does not enter the sewer system. Consistent with the City's Master Fee Schedule, this analysis assumes a 90% rate of return for FSEs. This rate of return is generally consistent with industry standards, which suggest that 90% of water used by FSE customers enters the sewer system.

3.2 EXISTING FOOD SERVICE ESTABLISHMENT GENERATION RATE DETERMINATION

The current process for calculating the sewage flow for restaurants is as follows:

FSEs with 12 seats or less:

For FSEs with 12 seats or less, the current flow is estimated at 294 GPD (21 EFUs) or 1.1 EDUs. The 1.1 EDUs was based on the old Master Fee Schedule sewer generation rates of 265 GPD per 1 EDU and 14 GPD per 1 EFU as shown in the calculation below:

EDU = EFUs X 14 GPD/265 GPD = (21 EFUs) X (14 GPD/265 GPD) = 1.1 EDUs

With the most recent update to the sewer generation rate from 265 GPD to 230 GPD occurring in July 2014, Staff recognized the need to update the current methodology for 12 seats or less. Chapter 8 shows a detailed analysis of this review.

FSEs with more than 12 seats:

The flow is calculated by counting the number of seats proposed. Each seat is assumed to generate 25 gallons per day. The sum total of gallons generated is then divided by 230 gallons per day (generation rate per EDU) to establish the equivalent number of EDU's. From the equivalent EDUs, the Sewer Capacity Charge can be calculated (equivalent EDUs multiplied by $3,450 (current charge per EDU)). Table 1 shows existing categories and flow rates for FSEs.

Table 1

Food Service Establishment	
Small (<= 12 seats)	1.1 EDU
Large (>12 seats)	25 GPD/seat*

*230 GPD= 1 EDU

On June 8, 2010, the City updated its Master Fee Schedule. The Update also modified the calculation and factors used to determine the FSE's rate of flow. Since that time, various changes in planned development and reduced flows of approximately 10% due to water conservation efforts have had an impact on the wastewater program. These changes justified review of the calculation and factors used to determine the Sewer Capacity Charge for FSEs.

3.3 MINIMUM CAPACITY FEE DETERMINATION

The Wastewater Engineering staff worked with the Building Department to determine the minimum fixture units required for an FSE to open within the City of Chula Vista. Based on the 2013 California Plumbing Code Sections 422.0 and 702.0, County of San Diego Department of Environmental Health, and the City of Chula Vista requirements, all FSEs are required to have at least 1 drinking fountain, 2 lavatories, 1 mop basin, 1 sink (each set of faucets) and 1 water closet. Table 2 shows the fixture unit equivalent value for the stated minimum requirement based on the 2013 California Plumbing Code.

Table 2

Fixtures	Fixture Unit Equivalent	Quantity Used	EFUs
Drinking Fountain	0.5	1	0.5
Lavatory	1	2	2
Mop Basin	3	1	3
Sink (each set of faucets)	2	1	2
Water Closet	4	1	4
Total			**11.5 EFUs**

The calculation below shows how the minimum requirement of 11.5 EFUs is converted to EDUs.

Minimum = 11.5 EFUs

(Minimum EFUs) X (12.1 GPD/ 230 GPD) = EDUs

Example calculation, for a location with 11.5 EFUs:

(11.5) * (12.1)/ (230) = EDUs

(139/230) = EDUs

0.6 EDUs

A minimum generation rate equal to 0.6 EDUs is recommended to be charged to any FSE regardless of number of seats. Therefore, the Sewer Capacity Charge for an FSE is proposed to be 0.6 EDUs of flow, or the calculated EDUs based on the wastewater generation rate per FSE category, whichever is greater.

Chapter 4
Results

Staff reviewed 187 FSEs of the 700 that were provided by the San Diego County Department of Health (DOH). These locations were chosen because they had water meters that were dedicated to that specific FSE and were not shared by multiple locations.

Each location was field inspected for the number of drainage fixture units as identified by the California Plumbing Code. The number of fixture units and the number of seats were counted.

After the data was collected, the locations were analyzed using several methodologies to identify relationships between the factors considered and the adjusted actual water use (90% of metered water consumption). The factors considered included water use vs. square feet, fixture units, seats (using current per seat flow rates) and location. The results are as follows:

The Seat method – using the current generation rate of 25 GPD per seat. This method was compared to the actual water usage as shown on exhibit 1. The data was simplified using best fit lines for each data set.

The blue line in Exhibit 1 represents the best fit line for actual water use for all FSEs surveyed. The red line represents the projected flow using the seat method with the current generation rate of 25 GPD. The graph shows that more than half of the locations would be overcharged. That includes all the FSE after the intersection of the 2 lines.

The Fixture Unit method - using the current generation rate of 14 GPD per seat. This method was compared to the actual water usage as shown on Exhibit 2. The data was simplified using best fit lines for each data set.

The blue line in Exhibit 2 represents the best fit line for actual water use for all FSEs surveyed. The green line represents the projected flow using the fixture unit method with the current generation rate of 14 GPD. The graph shows that most of the locations would be undercharged using this method. That includes all the FSE before the intersection of the 2 lines.

The 15 GPD/Seat method – An alternative methodology used by some other local agencies is the 15 GPD/Seat method. This method uses an equivalency of 15 seats per EDU. For Chula Vista, each EDU is 230 GPD. This would equate to Chula Vista's current seat method using a generation factor of 15.3 GPD. This method was compared to the actual water usage as shown on Exhibit 3. The data was simplified using best fit lines for each data set.

The blue line in Exhibit 3 represents the best fit line for actual water use for all FSEs surveyed. The pink line represents the projected flow using the 15 GPD/seat method with the generation rate of 15.3 GPD. The graph shows that more than half of the locations would be undercharged. That includes all the FSE before the intersection of the 2 lines.

The Average method – With no patterns emerging from the various methods described above, staff made the decision to utilize average historical data for all the FSE surveyed. The following graph as shown in Exhibit 4 was produced. This graph shows the light blue line representing the best fit line for the actual water use and the dark blue line representing the average water use for all FSE. The average was achieved by summing all GPD from the study year and dividing by the sum of the seats for all FSE. The result was a per seat rate of 20.83 GPD. This generation rate per seat was closer to the actual water use than any other method.

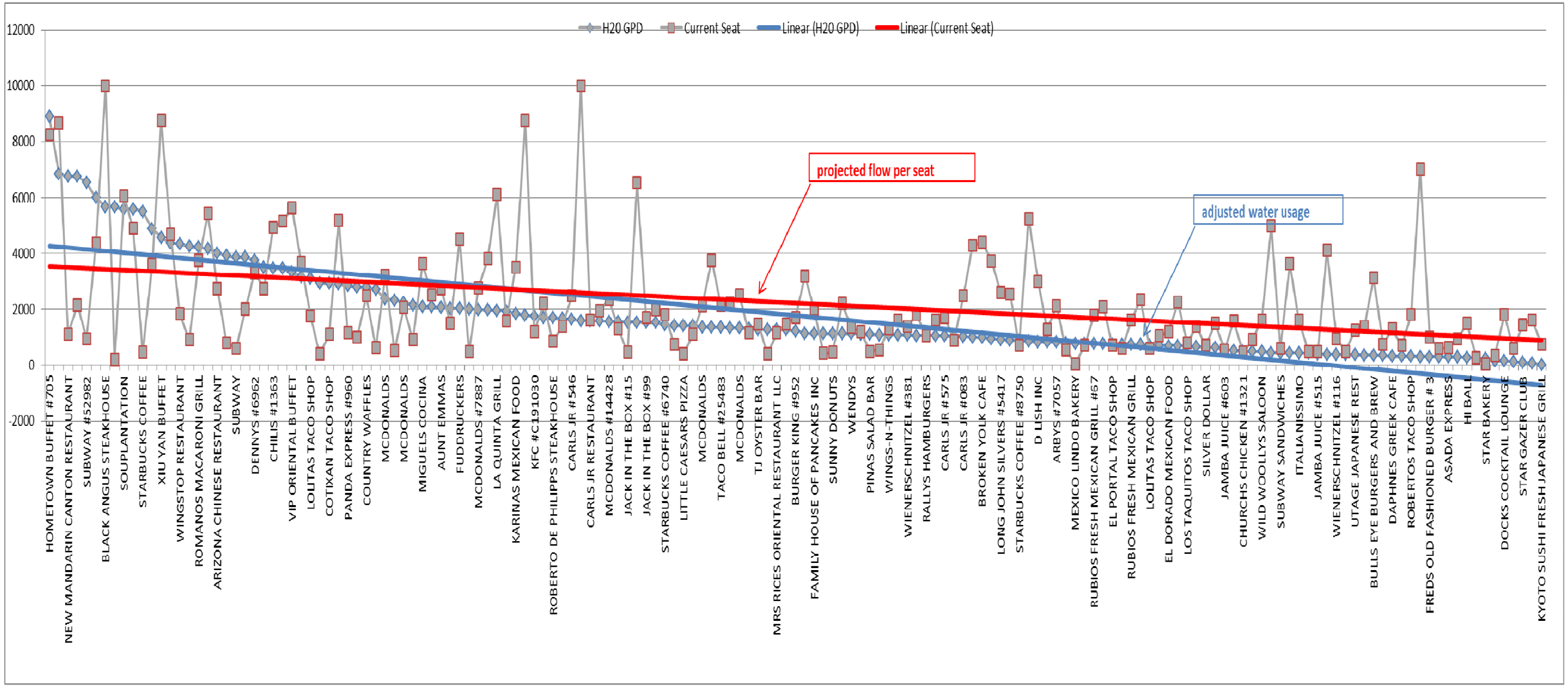

Exhibit 1 – Seat Method

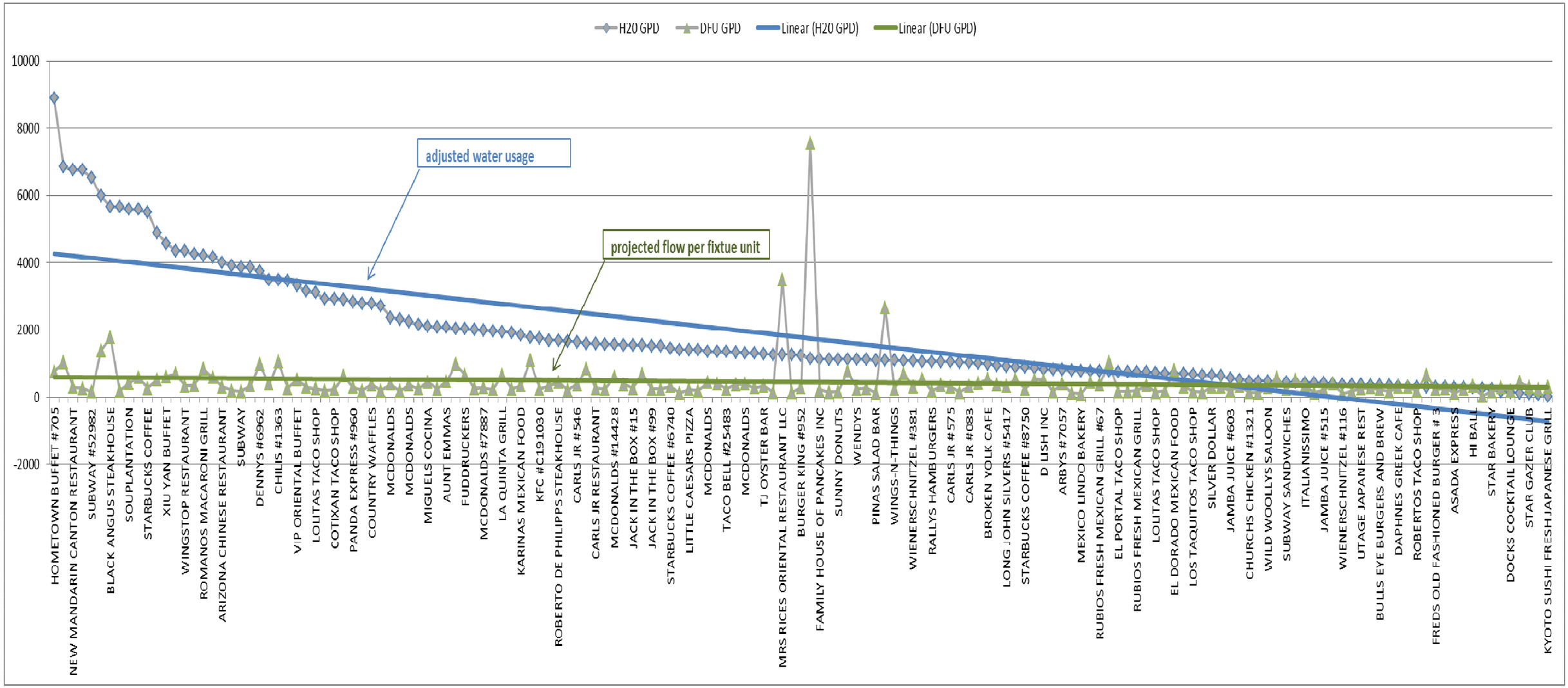

Exhibit 2 – Fixture Unit Method

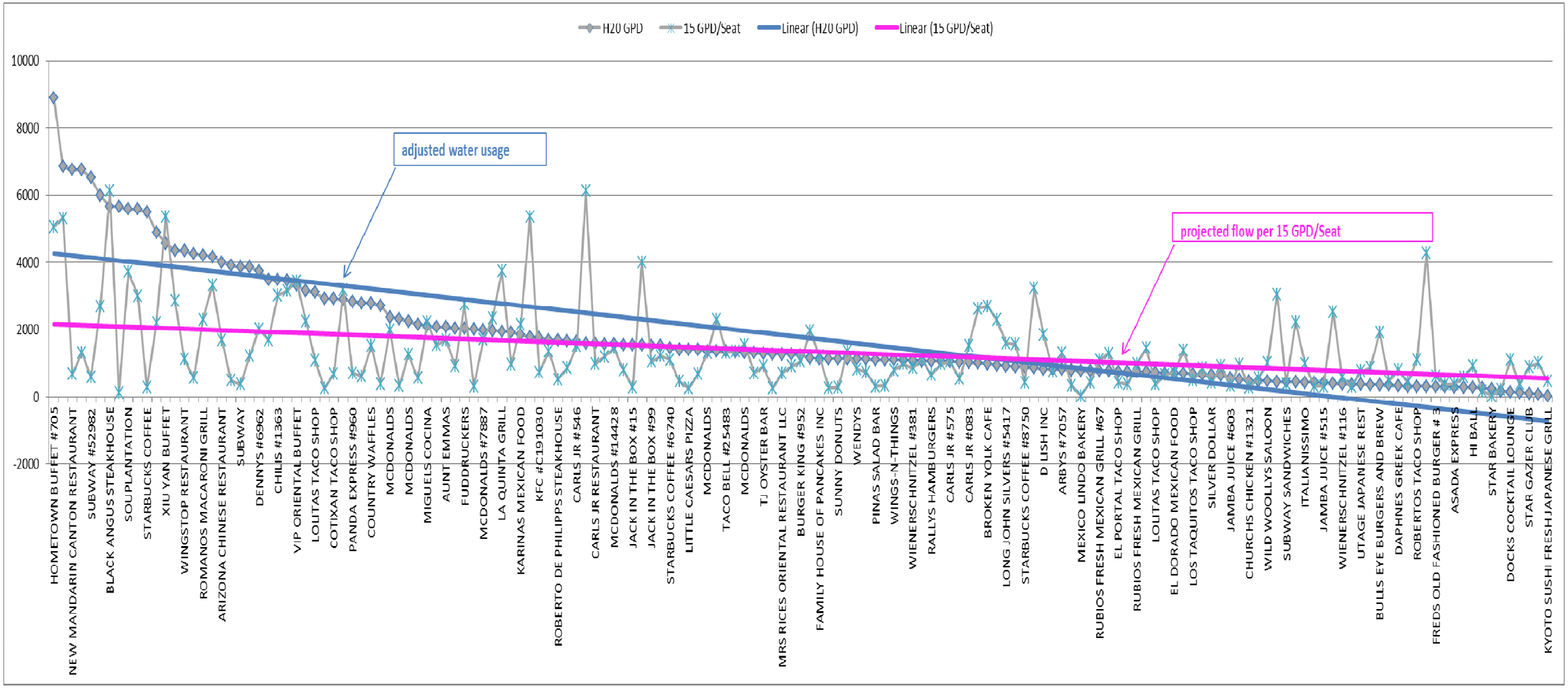

Exhibit 3 – 15 GPD/Seat Method

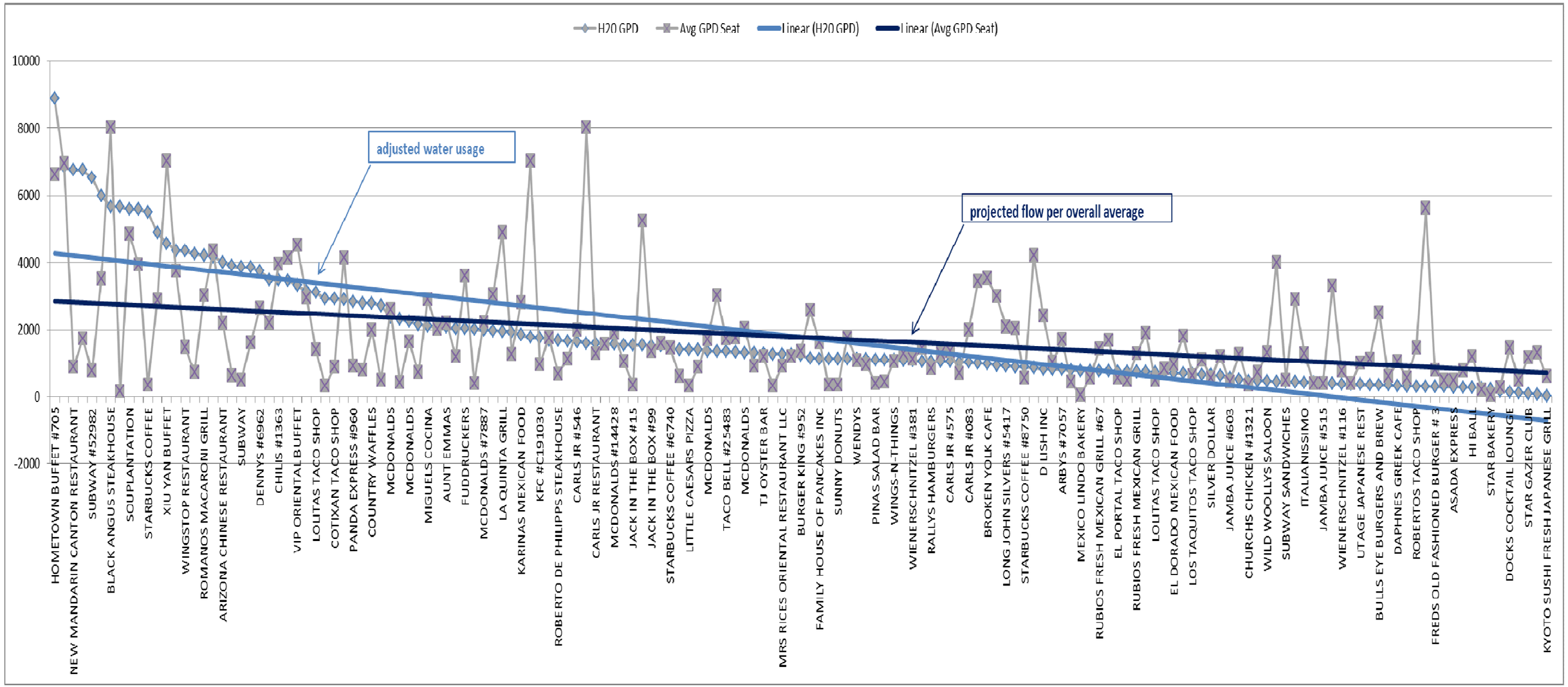

Exhibit 4 – Average Method

Staff further expanded the investigation by breaking the FSEs into 6 different categories. The DOH categories were expanded in an attempt to analyze and improve the nexus between the fee charged and the actual flows generated by FSEs. The categories utilized are as follows:

1. ***Fast Food with a Drive Through***: These locations have a drive through, no waiter, plastic utensils, paper products, no linens and disposable glassware. The food is self-ordered and picked up. No distinctions were made between chains and single locations (examples: McDonalds, Burger King, Roberto's)
2. ***Fast Food without a Drive Through:*** These locations ***do not*** have a drive through, no waiter, plastic utensils, paper products, no linens and disposable glassware. The food is self-ordered and picked up. No distinctions were made between chains and single locations (examples: Subway, Pizza Hut, Quiznos)
3. ***Buffets***: These locations feature an all you can eat menu, china table settings, non-plastic utensils, and non-disposable glassware. (Examples: Souplantation, Zorbas, Hometown Buffet)
4. ***Sit Down with a Waiter***: These locations feature a waiter, non-plastic silverware, china table settings, real glassware and a full menu. No distinction made between chains and individual Locations (Examples: Chilis, Black Angus, Karinas)
5. ***Coffee Shop/ Mini Mart***: These locations feature prepackaged food, and focus on beverage sales, no waiter, plastic utensils, paper products, no linens and disposable glassware. The food is self-ordered and picked up. No distinction made between chains and individual Locations (Examples: Starbucks, Jamba Juice, Shell gas station)
6. ***Bar/Nightclub:*** These locations serve mainly alcohol and prepackaged food only. The utilize real glassware No distinction made between chains and individual Locations (Examples Hi Ball, Silver Dollar, Docks)

The data was analyzed for each category. As an example, using Category 3, Buffets, Exhibit 5 shows adjusted actual water usage (blue line) compared to the overall average (orange line). This seems to be close, but the overall average still estimated more flow than actual in most of the cases.

Staff then tried an in-category average to see if the flow estimation would be closer. The analysis shows (see Exhibit 6) that the projected flow per category seat method (darker blue line) more closely resembles the adjusted water usage (light blue line) for this category. In addition, there is a balance within each category that helps correct the overall weight of each FSE on the system.

The same analysis was done for all categories of FSE with similar results as shown on Exhibits 7-12

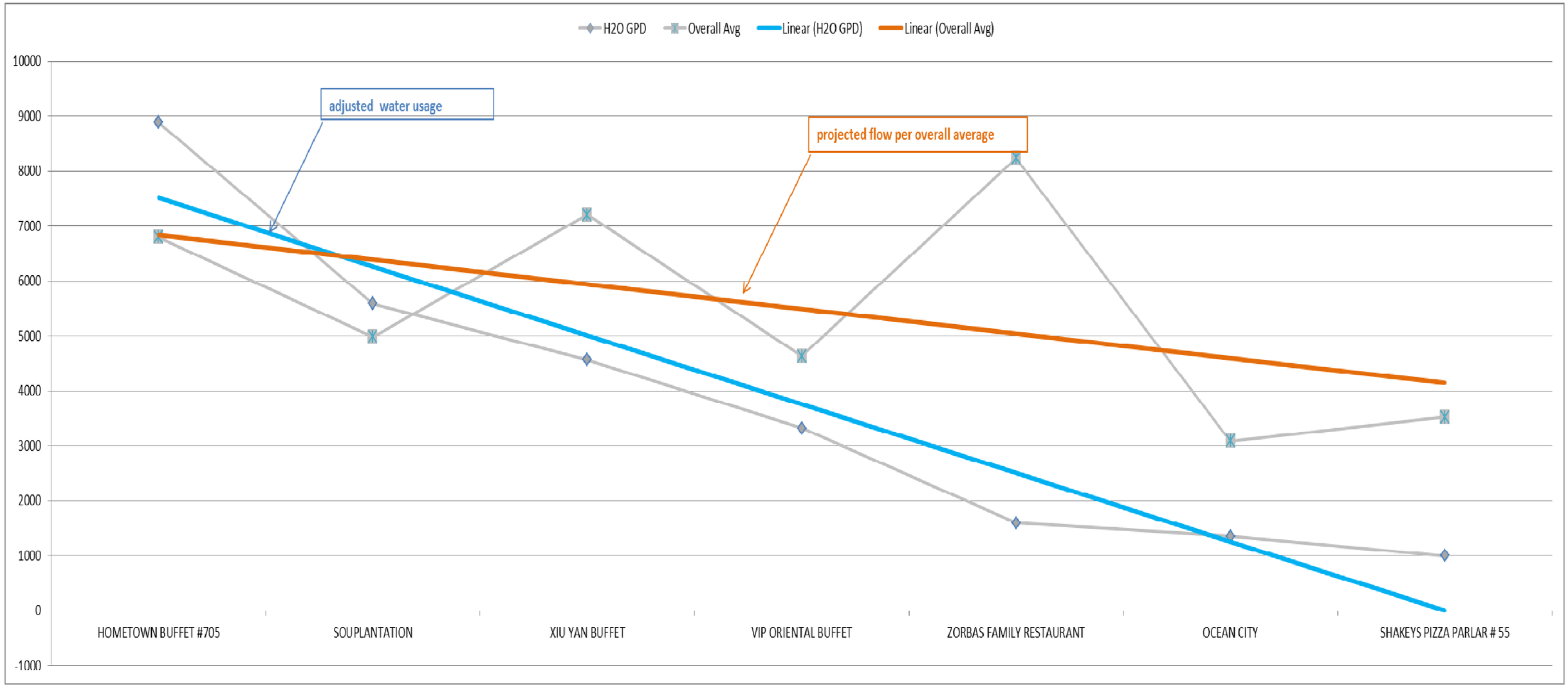

Exhibit 5 – Category 3, Buffets, Adjusted Water Usage Compared to Overall Average Method

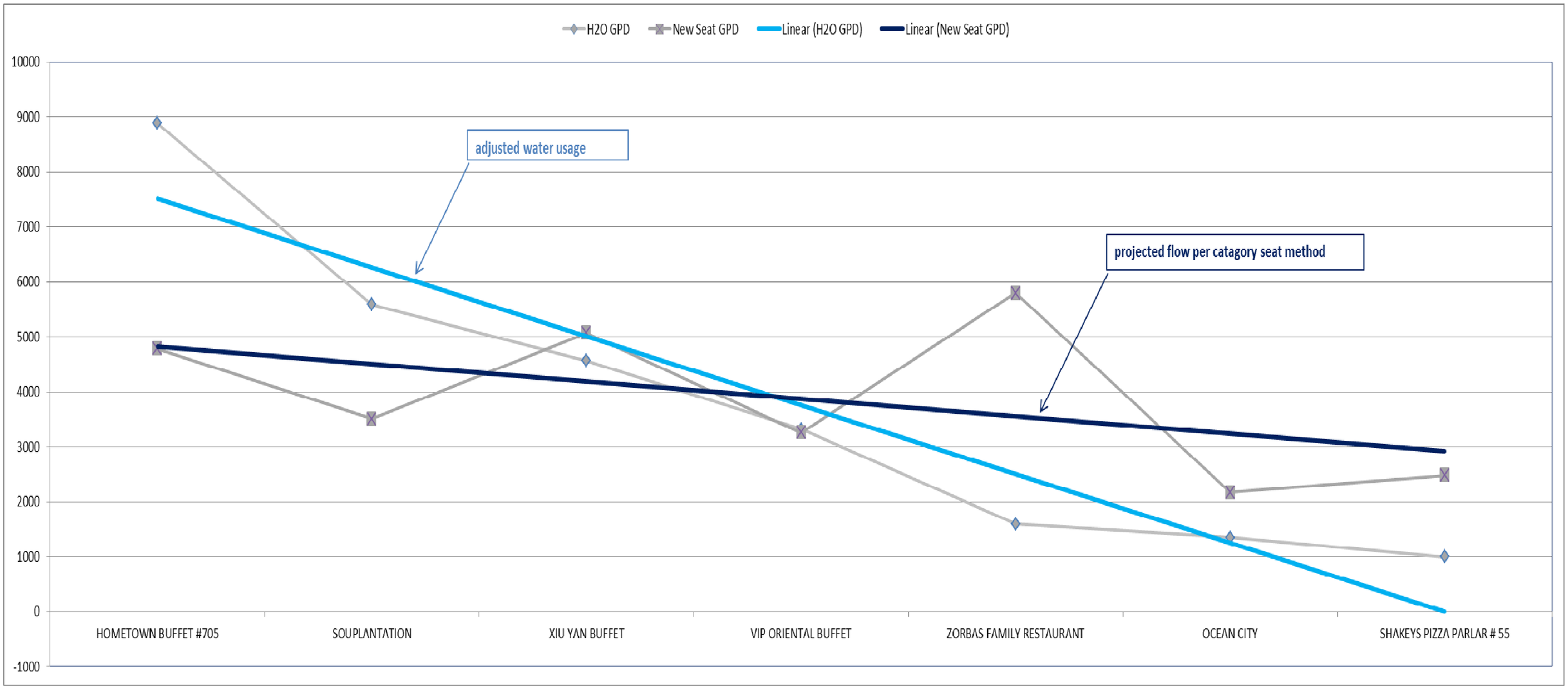

Exhibit 6 – Category 3, Buffets, Adjusted Water Usage Compared to Category per Seat Method

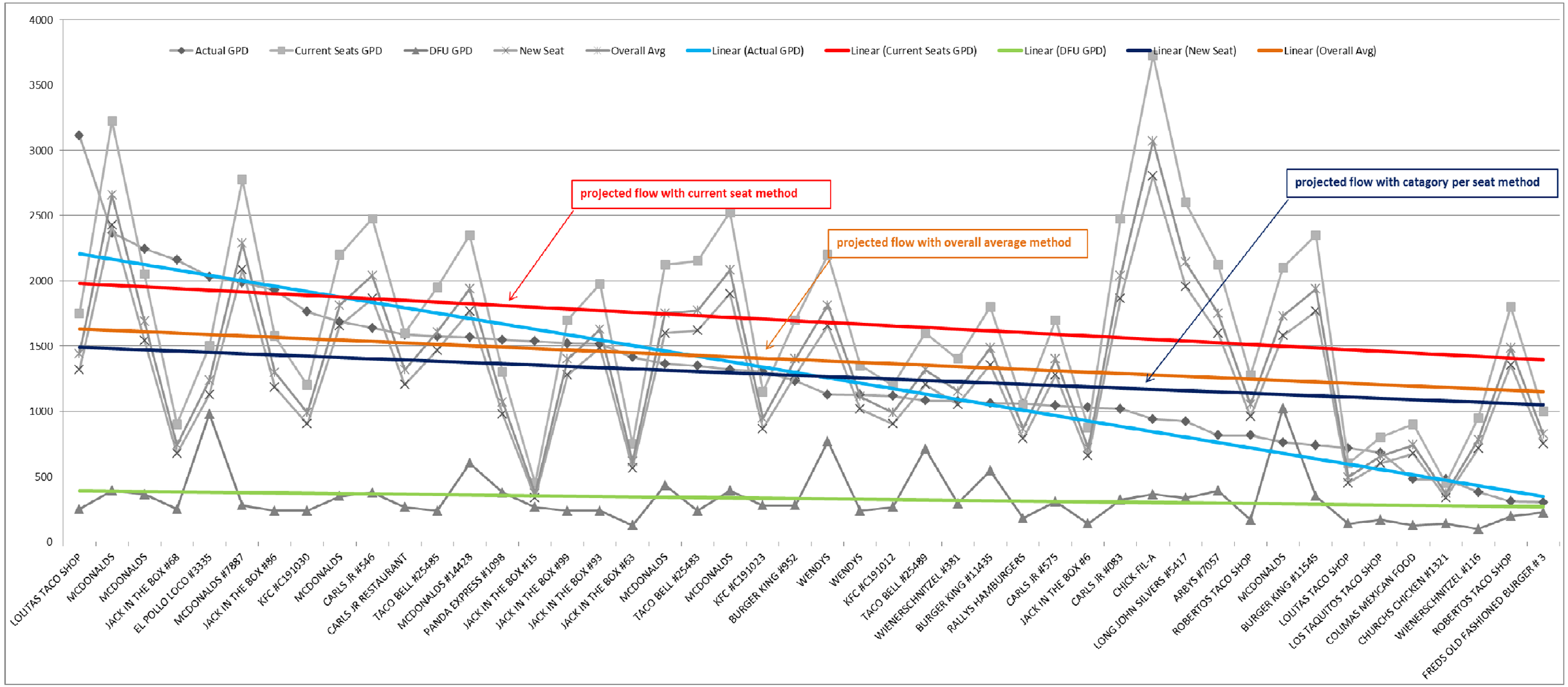

Exhibit 7 – Category 1 Fast Food with a Drive Through

adjusted water use per day is 1,279 Gal

average seat count is 67

generation per seat in category 1 is 18.8 GPD/Seat (1,279/67)

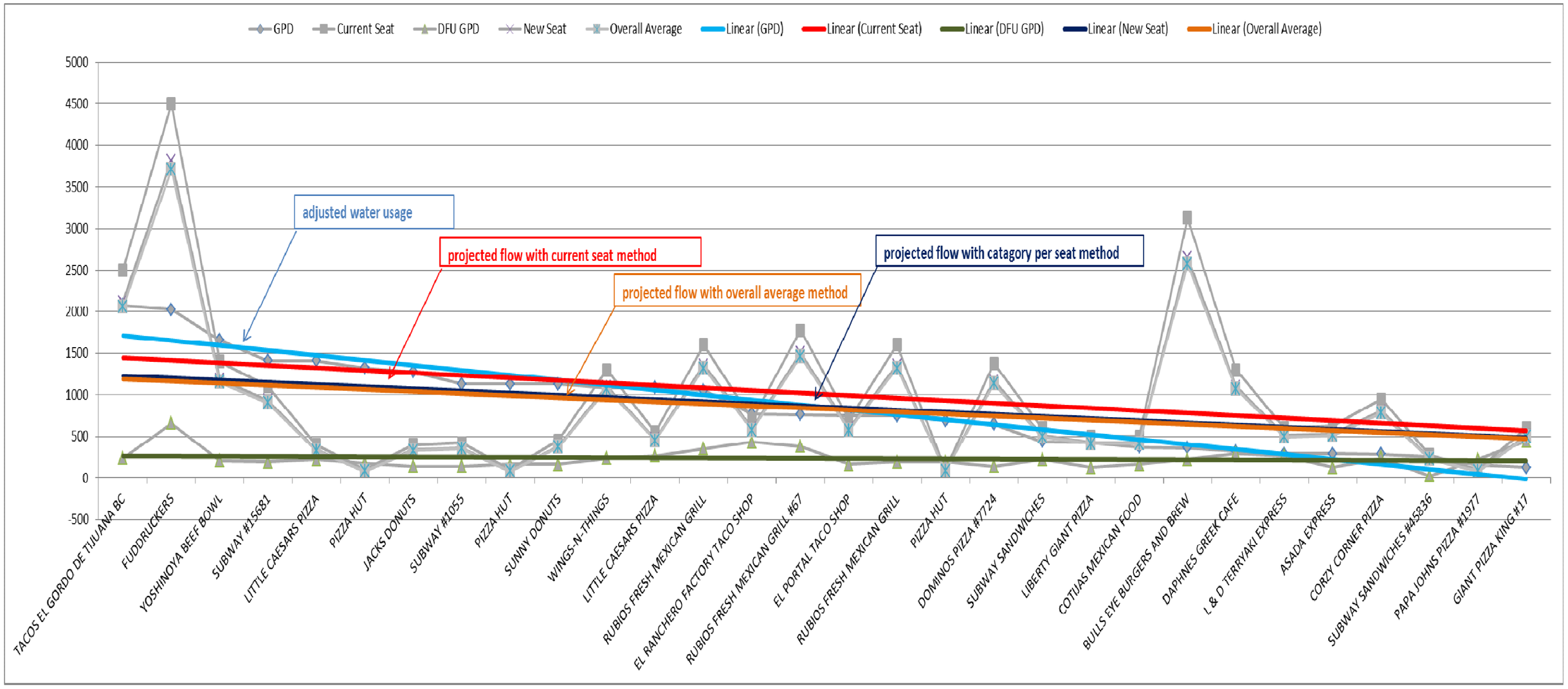

Exhibit 8 – Category 2 Fast Food without a Drive Through

adjusted water use per day is 849 Gal

average seat count is 40

generation per seat in category 2 is 21.2 GPD/Seat (849/40)

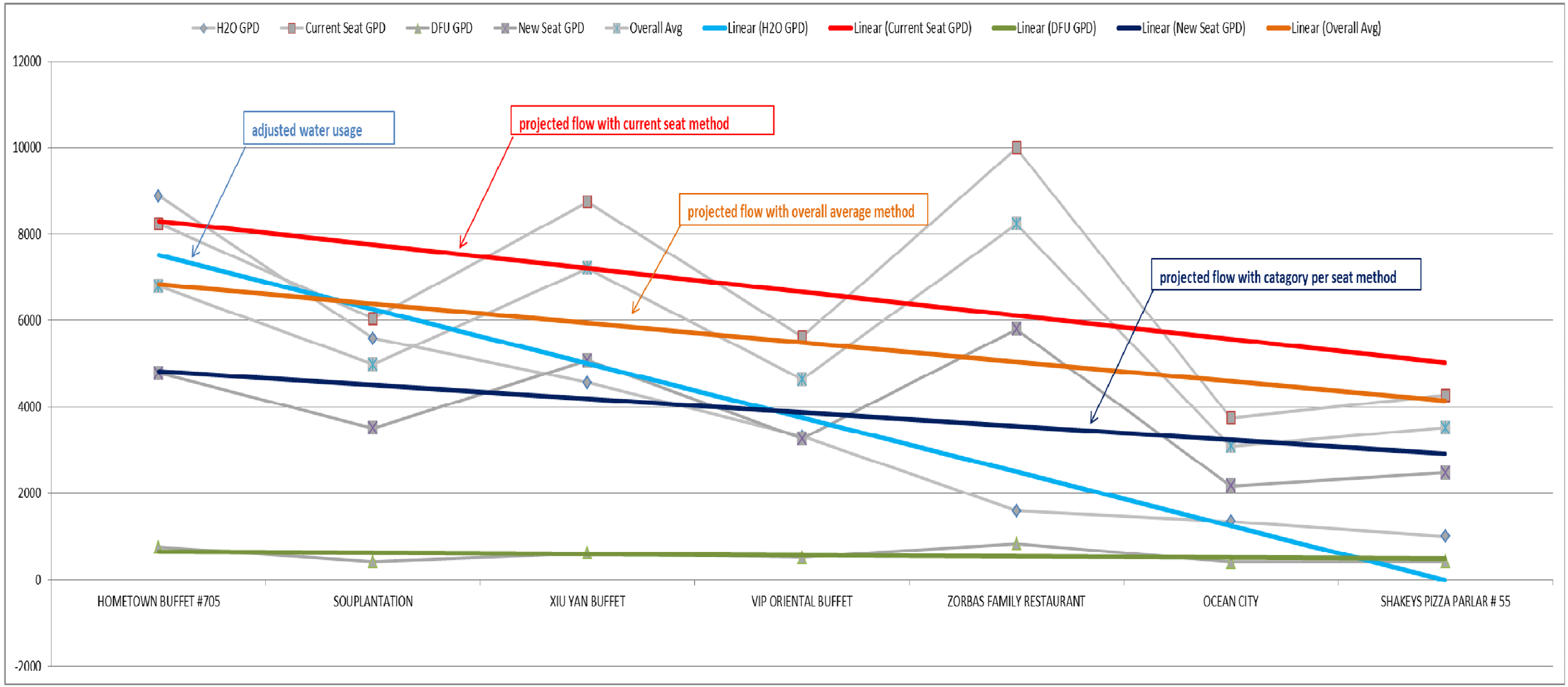

Exhibit 9 – Category 3 Buffets

adjusted water use per day is 3,426 Gal

average seat count is 236

generation per seat in category 3 is 14.5 GPD/Seat (3,426/236)

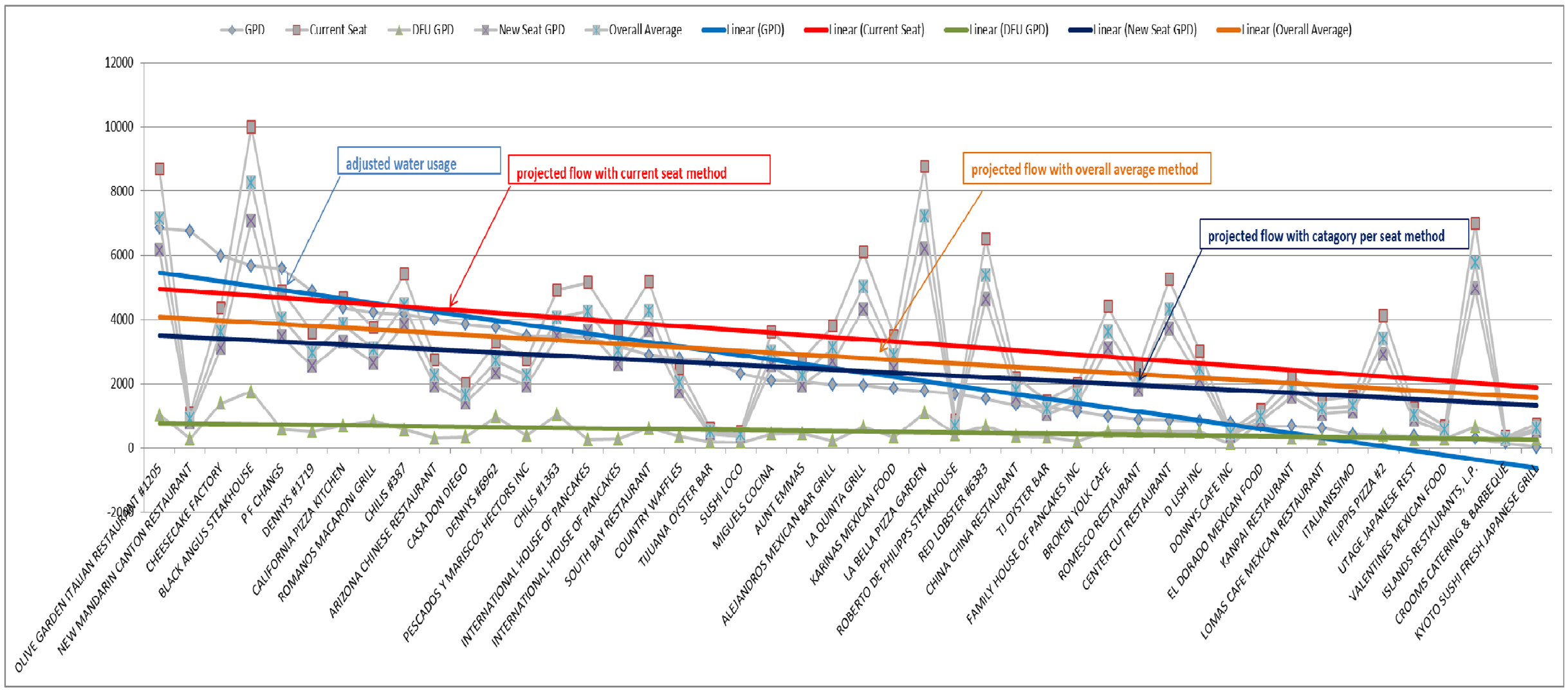

Exhibit 10 – Category 4 Sit Down with Waiter

adjusted water use per day is 2,423

average seat count is 137

generation per seat in category 4 is 17.7 GPD/Seat (2,423/137)

Exhibit 11 – Category 5 Coffee Shop / Juice bar

adjusted water use per day is 817 Gal

average seat count is 41

generation per seat in category 5 is 19.9 GPD/Seat (817/41)

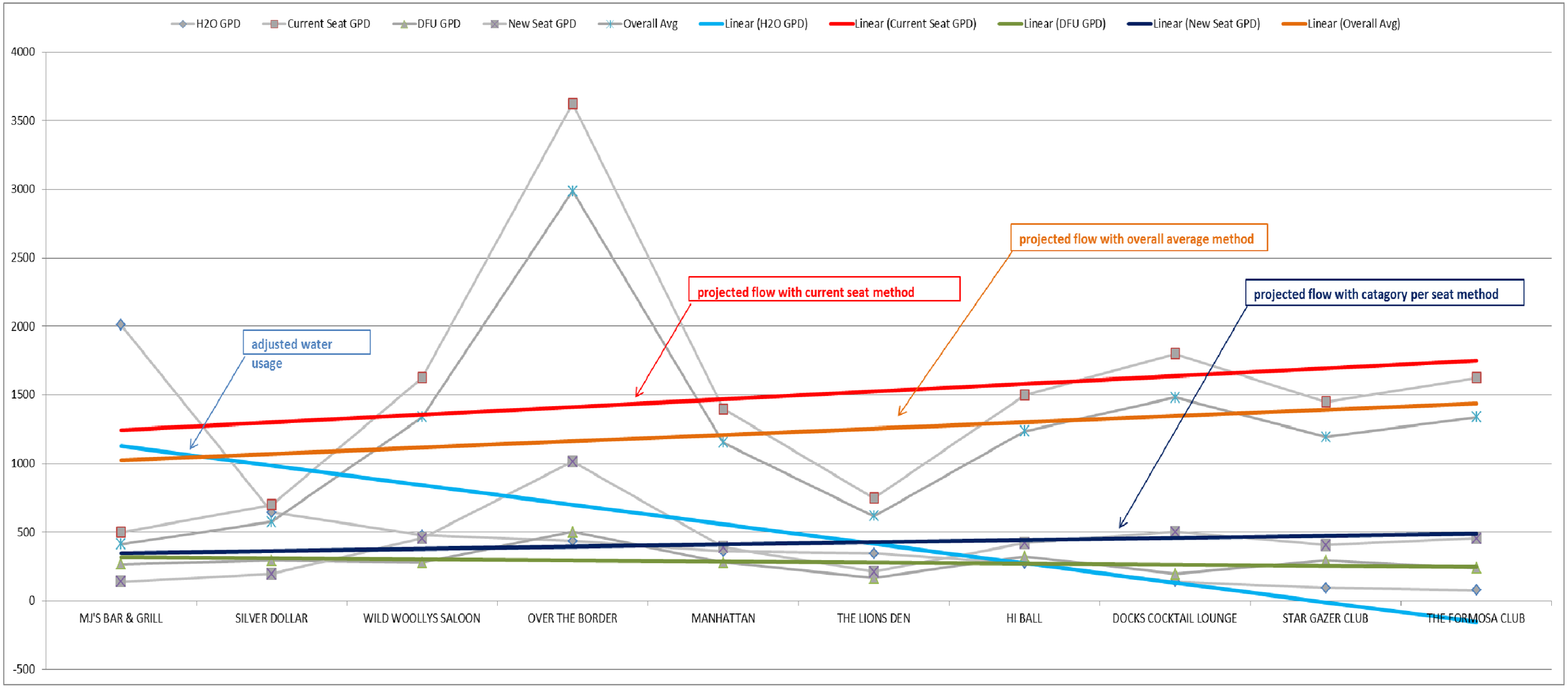

Exhibit 12 – Category 6 Bar/Night Club

adjusted water use per day is 486 Gal

average seat count is 60

generation per seat in category 6 is 7 GPD/seat (486/60)

A comparison of the current capacity formula with the proposed capacity formula is shown below.

Current Capacity Formula (>12 Seats)

(S*25)/D = EDU

S = # of seats
25= 25 GPD/Seat
D= 230 GPD
EDU=Equivalent Dwelling Unit
$3,450= Cost per EDU

Example calculation, for a location with 127 seats:

((127*25)/230)*$3,450
(3,175/230)*$3,450
13.80*$3,450
$47,610 = Capacity Fee

Proposed Capacity Formula for a Sample Category 2

S= # of Seats
F=21.2 (GPD)
230=GPD per EDU
((S*F)/230)

Example calculation, for a location with 127 seats:

((127*21.2)/230)*$3,450
(2,692/230)*$3,450
11.70*$3,450
$40,365 = Capacity Fee

The comparison above shows that the recommended revisions will result in a reduced fee of $7,245 ($47,610-$40,365) for a Category 2 FSE with 127 seats.

Chapter 5
Conclusions and Recommendations

Currently, there is no viable technology that can accurately measure the wastewater discharge per individual FSE. City staff contacted various manufacturers in an attempt to procure wastewater discharge monitoring equipment. The most advanced meters used to monitor flow are not designed for pipes as small as a sewer lateral. In addition meters require continuous flow in order to properly monitor increases or decreases in flow. As a result of the inability to accurately measure wastewater discharge flows, an analysis was performed to estimate the wastewater generation from a proposed FSE. This analysis assumes that 90% of the metered water an FSE uses will be discharged back into the wastewater system. This assumption is consistent with the 2013 Chula Vista Sewer Cost of Service Rate Study, regional and national industry standards.

The correlation between the number of seats and fixture units showed no discernable patterns from which to estimate sewer flows for future FSE within the same category. In addition, the calculated sewer flows were far from the actual water usage per category.

Based on the findings of the water usage data for FSEs, this study recommends revising the flow rates and the EDU calculations for FSEs as follows:

Food Service Establishment*
Category 1 (Fast Food with Drive Thru) ..... 18.8 GPD/seat
Category 2 (Fast Food without Drive Thru) ..... 21.2 GPD/seat
Category 3 (Buffets) ..... 14.5 GPD/seat
Category 4 (Sit Down with Waiter) ..... 17.7 GPD/seat
Category 5 (Coffee Shop /Juice Bar) ..... 19.9 GPD/seat
Category 6 (Bar/Night Club) ..... 7 GPD/seat

*1 EDU=230 GPD

This study recommends that the FSE categories be expanded to the six, as shown above, along with a minimum rate.

An analysis using the minimum fixtures an FSE would need to meet various government codes and requirements resulted in a minimum generation rate equal to 0.6 EDUs. This minimum rate is recommended for all FSEs regardless of number of seats. Therefore, the Sewer Capacity Charge for an FSE is proposed to be 0.6 EDUs of flow, or the calculated EDUs based on the wastewater generation rate per FSE category, whichever is greater.

This modification will provide a more accurate estimate of actual discharge than the current method and the other alternatives studied and presented in this report, thereby

improving the nexus between the fee charged and the actual sewer flows generated by FSEs.

The Sewer Capacity Charge will be calculated based upon the category the FSE falls into and the number of seats the FSE has. The number of seats will be multiplied by the generation rate of the appropriate category. The total will then be divided by 230 gpd (the amount equivalent to 1 EDU). This will determine the number of EDUs to be multiplied by $3,450 to calculate the fee to be charged.

The recommended revisions will result in reduced fee calculations for all FSE categories.