SECTION 3 – TECHNICAL SPECIFICATIONS

3.1 GENERAL REQUIREMENTS

These specifications are the minimum requirements for setback truck tractors that are used in combination with existing 85 cubic yard capacity refuse transfer trailers that are 41 feet long. The County presently operates approximately 150 of these combination units on a seven to ten year life cycle. These combination units will be used seven (7) days a week right (8) hours per day and may be used up to sixteen (16) hours per day depending on the daily workload. These truck tractor and trailer units will be predominately operated on paved roads within Miami-Dade County and are also required to have full capabilities of unloading refuse and scaling landfill sites. It is a required that all units proposed be of superior build quality enabling the daily operation of these tractors with reliability characteristic of vehicles manufactured using only the best commercial practices. All units must be equipped with the manufacturer's standard equipment and be constructed using components recommended by their manufacturers for hauling refuse transfer trailers, as well as meeting the following supplemental requirements.

3.2 OPERATION

It is expected that each unit will be operated approximately 30,000 miles per year.

3.3 CHASSIS

GVWR to match or exceed FDOT requirements with the front and rear axles stipulated.

a. FRAME: R.B.M. minimum is 1,900,000 lbs. but in no event may be lower than the minimum R.B.M. recommended by the manufacturer of the cab and chassis used for the work vocation and applications intended.

b. WEIGHT AND DISTRIBUTION: A certified weight ticket to document the total unit weight must be available at the prototype inspection. Charts showing the proposed weight distribution loaded and unloaded should be submitted with the bid. Bidders should assume the load is evenly distributed in the trailer and the loaded GCW is 80,000 lbs. for the fully loaded chart.

c. DIMENSIONS: Charts stipulating the projected build dimensions should be submitted with the bid. Certain guidelines are specified below. The County reserves the right to make adjustments to the submitted dimensions and will issue approval for the prototypes build dimensions at the pre-construction conference.

1. WB (Wheelbase):	Minimum 200" or greater depending on final DGE tank size and configuration and hydraulic tank size and placement on the chassis
2. CT (Cab to trunnion):	Shortest possible as recommended by the OEM based on final selected wheelbase in 3.3 C. 1.
3. AF (Aft of frame):	specify. (Please advise what this means. Thanks.)

4. The distance from the front of the front tire on the truck tractor to the rear of the rear most tire on the transfer trailer is not to exceed sixty (60) feet.

d. CA (Cab to axle) – As recommended by the cab and chassis manufacturer for this application.

e. Wall to wall and curb to curb turning circle charts for the tractor unit proposed.

3.4 CAB

Conventional air ride cab design with manufacturer's OEM air-conditioning with cabin and fresh air filtration (if available) and heating systems are required with the following supplemental requirements:

a. Bostrom Liberty high-back air suspension driver's seat with Cordura fabric or Sears equal, or other equal seat that may be designated by the County at the preconstruction conference; and the manufacturer's standard passenger seat, with OEM installed seat belts.

b. Wide view type windshield with tinted safety glass all around.

c. Provide and install a methane gas warning system as recommended by the OEM for the detection of methane gas in the cab at all times. This system should include an audible and visual warning alert that can be seen and heard from the outside of the tractor cab.

d. The cab shall be insulated against heat, cold, and noise.

e. Arm rests, a dome light, interior sun visors, a map compartment, AM-FM radio, rubber flooring, and non-skid rubber floor mats shall be furnished. Two power points on a separately fused 30 amp circuit in addition to a J Port which may not be shared with any other electrical or electronic components, and must be located in the cab with convenient access. The J port must have its own circuit breaker.

f. 6" X 16" stainless steel mirrors and 8" spot mirrors or approved equal mounted on the left and right sides of the cab and exterior grab-handles. Manufacturers who offer mirror combinations with supports built into the cab body that performs the same functions shall be acceptable. Final locations of all mirrors shall be subject to County approval.

g. Scale reading cab instrumentation, which includes an ammeter or voltmeter, speedometer with odometer, tachometer, hour meter, oil-pressure, water temp, CNG fuel, transmission temperature and air-pressure gauge, with a visual alert indicator and an audible alarm, are required. Where truck manufacturer or engine electronics include these functions in dashboard displays those displays shall be acceptable.

h. Dual bumper guides consisting of a spring base mounted fiberglass rod mounted on the outer edge of the right and left front bumper and visible from the driver's seat shall be furnished.

i. Fiamm or Hadley 133 db single or dual trumpet horn single base or its equivalent shall be furnished. The final horn location is subject to approval by the County. Final horn location shall be approved at the prototype inspection.

j. Tilt and telescope steering column (if available) and tinted glass on all windows, including windshield.

k. A 5-pound (minimum), ANSI/U.L. approved, A B C rated and dry chemical fire extinguisher shall be mounted on the floor next to the driver's seat. The fire extinguisher shall be easily accessible by opening the driver's side door. The fire extinguisher shall be tested to ANSI/UL 711 and ANSI/UL 299 marine type U.S.C.G standards.

l. OEM exterior mounted full width sun visor for the complete front windshield.

3.5 LIGHTS AND REFLECTORS

Lights and reflectors shall meet F.M.V.S.S. and Florida D.O.T regulations. LED lighting shall be used wherever possible for lights except for LED front headlights are not required.

3.6 COOLING SYSTEM

Maximum cooling capacity within the chassis and engine manufacturer's recommended range, with all related components selected to afford maximum cooling and a recovery system for overflow.

a. An Extended Life Engine Coolant and water-conditioning filter, if available, or supplemental additive system.

3.7 ENGINE

A Cummins ISX12-G Compressed Natural Gas engine rated at 400 horsepower power and 1450 foot pounds of torque, **"NO SUBSTITUTION".** A written five (5) year 100% coverage engine warranty shall be supplied for each engine purchased. If not provided by engine electronics, an automatic safety device shall be installed and adjusted to prevent engine damage in case of oil pressure failure, cooling system overheating or low coolant level, by stopping (not de-rating) the engine. This system shall include a brief duration emergency override for safety purposes. Additional requirements are listed below:

a. Fuel filtration as recommended by the engine's manufacturer with the OEM recommended fuel/water/oil separator.

b. Engine Air filter with dash mounted air restriction indicator.

c. The awarded Bidder will be required to furnish a frame mounted skid plate to protect the engine and transmission, fabricated from 3/16" steel plate. The skid plate design shall provide maximum ground clearance without restricting engine access or cooling and be a bolt on/off type. The skid plate shall provide access to any filtration or drains it restricts access to. If not available directly from the truck's manufacturer, the Bidder shall provide details and drawings of the proposed local installation with its bid. All designs and mountings shall be subject to review, approval and revision by the Fleet Management Division.

NOTE: All generic filters used for liquids and fluids shall be the spin-on type and all lubricants shall be synthetic where recommended by the component's manufacturer in this application. **NO SUBSTITUTION.**

3.8 TRANSMISSION

Allison 4500 RDS with the Allison short dip stick option for measuring the oil in the transmission, equipped with Allison recommended torque converter in a six (6) forward speed configuration with an external cooler and Allison push button selector or equal mounted either in the dashboard or another mutually agreed location which shall not interfere with the operator's hands or feet.

All Allison no charge program options (LBSS, RELS, SEM, VAC, etc.) are to be programmed to operate into the transmission. When the parking brake is activated and the truck is in forward or reverse gear, the transmission is to be configured to automatically shift into the neutral position. A written five (5) year 100% coverage transmission warranty shall be supplied for each vehicle purchased.

All transmission mountings shall be in accordance with all transmission and truck manufacturer's recommendations and the lowest point of the transmission and attendant lines shall not be below the lowest point of the rear axle housing and shall be engineered for maximum ground clearance.

The transmission oil cooler shall enable dissipation of enough heat for extended function at maximum torque stop and go conditions.

The transmission shall use the Parker Chelsea power shift (shift on the go) PTO "NO Substitution". The PTO is to be mounted to the converter housing (at the left side, down location is preferred), and use 12V electric shifting. The PTO solenoid control shall be dash mounted and the entire PTO installation and pump shall have gear ratios selected and engineered to work in concert with a Parker hydraulic pump "NO SUBSTITUTION" geared to deliver no less than 37 GPM and no more than 50 GPM.

3.9 FRONT AXLE AND SUSPENSION

Rated minimum capacity of no less than 14,000 lbs. as recommended by the truck's manufacturer for this application and weight loading. In no event may this provide less than a 10% spare capacity between the minimum required by FDOT for the weight to be carried (See Section 3, paragraph 3.3 (b)) and with 10 stud drums and non-aluminum hubs.

3.10 REAR AXLE AND SUSPENSION

Hendrickson Haulmaxx rubber suspension with rear shocks, rebound straps for bolsters, and a minimum rated capacity of 46,000 lbs. as recommended by the manufacturer for this application with 10 stud drums and nonaluminum hubs.

a. Power divider – A driver controlled power divider affecting all tandem axles shall be supplied with a dash mounted visual indicator and audible alarm to alert the operator when engaged.

b. Final drive ratio of - 5.57. Final gear ratio delivering the best overall performance and fuel economy will be selected by the County in coordination with the awarded bidder at the preconstruction conference **"NO SUBSTITUTION".**

3.11 WHEELBASE AND STEERING

Wheelbase shall be reviewed and optimized by the manufacturer involved to provide the optimum chassis dimensions for the vehicle proposed. Where frame rails must be cut, channeled, notched or modified in any fashion other than standard drilling to mount an ancillary item or tank, written approval to do so must be obtained in advance from the County.

a. Power steering system designed for vehicles of this dimensional size, weight and type of service with all front wheel, axle and suspension components selected to provide maximum safe wheel cramp angle and resulting minimum turning circle radius within the capacities and dimensions specified.

3.12 WHEELS AND TIRES: NO SUBSTITUTION

For the front axle provide a satin non reflective appearance Alcoa or Accuride, hub piloted aluminum 10-bolt hole 9.0 wide severe service wheels with Goodyear G289WHA 315/80 all position tires. Front wheel offsets shall be selected to provide maximum turning cramp angle on the axle used within the wheel width recommendations of the tire manufacturer.

For the rear tandem axles provide a satin non reflective appearance Alcoa or Accuride, hub piloted 10- bolt hole 8.25 wide severe service wheels with Goodyear G287MSA 12R22.5 or G751MSA 12R22.5 tires at all positions.

3.13 COMPRESSED NATURAL GAS (CNG) FUEL TANK SYSTEM

Provide and install an OEM fuel system installed on the assembly or a complete Agility Fuel System Company Compressed Natural Gas (CNG) Fuel System "No Substitution" with a capacity of no less than ninety (90) diesel gallon equivalent (DGE).

The fuel tank system is to be properly mounted/installed on the frame of the truck tractor as recommended by the OEM and Agility. The mounting system chosen should prevent the tank system from coming lose from the truck due to road vibration and operation of the unit on the rough terrain unimproved found in the landfill. In addition the tank mounting/installation system must be NHTSA tested and approved. Approval documents should be submitted with the bid.

All CNG lines should be properly secured and/or clamped to prevent rupture from chaffing or rubbing against other items. All CNG fuel lines which run next to hot exhaust (turbo, piping, etc.) should be heat shielded as recommend by the manufacturer to prevent damage to them from heat.

The CNG system is to be equipped with the following items:

A. In a central location on the curbside of the vehicle include a fast, slow (timed) and defueling/transfer fueling ports and a CNG Pressure or fuel tank level gauge

B. Slow (timed) fill recessed fueling port on the front tractor with final location to be approved at the pre-construction conference.

C. Easy to access and drain CNG fuel filter as close as possible to the slow and fast fill fueling ports on the curbside.

3.14 EXHAUST

Vertical to a height not to exceed 12' 8" from ground level with an elbow at the top of the stack and a stainless steel or aluminum protective exhaust guard installed so as to completely prevent burns or injury to anyone entering the cab.

3.15 ELECTRICAL

A twelve (12) volt system with no less than a 140 - ampere alternator and 1800 CCA batteries. All copper wiring with each wiring circuit protected by a resettable easily accessible circuit breaker. J port and an additional power point conveniently located in the cab must be provided.

a. A quick connect battery jumper connection shall be provided at a location near the battery box, to be finalized at the pre-construction conference.

b. A battery disconnect switch with an amber clearance light on top of the cab to show power is "on".

c. The battery box top must be on a tether to prevent loss or theft.

3.16 LINES, FITTINGS AND WIRING

All air, hydraulic, cooling and transmission lines shall be located and secured or clamped/anchored in the chassis. Should the chassis design prohibit this, then the lines shall be securely mounted above the centerline of the axles. All pressure side hydraulic hoses that could "spray around" in case of a hose rupture shall be encased in a protective sheath, to prevent such occurrence.

a. As-built schematics for electrical, air and hydraulic systems shall be furnished with the equipment order of each equipment type. All subsequent deliveries of that equipment type under this contract shall be built to match any and all changes, requiring a new set of revised schematics.

3.17 FLAPS

The truck manufacturer shall supply appropriately mounted regulation size anti-sail mud flaps for the rear of the front axle if their body configuration does not prevent rearward splatter of water and debris onto the fuel tanks and steps. Mud flaps with anti-sail brackets mounted front and rear of the rear tandems.

3.18 TOW HOOK

Front mounted manufacturer's recommended hook(s) or pin(s) appropriate for moving or towing the vehicle.

3.19 DRIVELINE

Ratings and capacities as recommended by the manufacturer for the application and capacities intended.

3.20 BRAKE SYSTEMS

"S" Cam drum-based system with all wheel ABS meeting Federal Motor Vehicle Safety Standards; Air Brake Systems; Final Rule, 74 Fed Reg. 37122 (July 27, 2009) (amending 49 C.F.R. 571.121).

a. Front Axle – The widest available 16.5 diameter brake linings as recommended for the axle selected with Type - 30 or equal brake chambers.

b. Rear Axle – 16.5 X 8.62 brake linings recommended for the axle selected with Type-30 or equal spring set brake chambers on both rear axles.

c. Wabco two stage air dryer with the oil coalescent filter cartridges or County approved equal to be approved at pre-construction conference and minimum 15 CFM compressor.

d. Maximum capacity air reservoir(s) equipped with automatic draining capability and pull cord drain valves conveniently located.

e. A breakaway valve, two way system, with dash mounted control.

3.21 FIFTH WHEEL: NO SUBSTITUTION

a. Fontaine # SLTPLH5092 or Holland # FW0070 with a minimum 150,000 lbs. draw bar.

b. Mounting brackets 3/8 inch angle bolt on type.

c. The fifth wheel and kingpin settings will be determined at the pre-construction conference.

3.22 TRACTOR AND TRAILER HYDRAULICS

These tractors shall be designed and equipped to accommodate the hydraulic system used by the existing refuse trailers' hydraulic ejection system. Bidders are encouraged to thoroughly inspect and become familiar with the system being used as per Section 2. It is a requirement of this bid that the same system with racks, mounts, tie-downs, supports, etc., shall be furnished "ready to use". All hydraulic hoses shall have a minimum pressure rating of 2500 #.

a. A tractor and trailer will be available for viewing as per Section 2, paragraph 2.6.

b. The bidder shall provide a specification sheet with technical data supporting the application and settings, upon request. All settings must be in accordance with manufacturer's recommendations.

3.23 HYDRAULIC RESERVOIR

a. Commercially available JIC type .250" minimum thickness steel or .375" minimum thickness aluminum hydraulic reservoir with no less than a 110 gallon capacity. The reservoir is to be baffled to separate return from inlet to promote de-aerating, heat transfer and drop contaminates. The reservoir is to have an easily accessible cleanout cover as close as possible to suction strainer to facilitate cleaning and one ¾" NPT drain. Final hydraulic tank size and configuration is subject to approval at the preconstruction conference.

b. The reservoir shall be chassis mounted behind the cab with the proper isolation to prevent vibration damage.

c. The filler port shall have a screen to prevent contaminants from entering the tank and be equipped with a watertight locking cap (if available).

d. The hydraulic tank must be equipped with a Eaton Vickers H20-gate breather or County approved equal. The venting capacity must be equal to the displacement capacity of the hydraulic pump used and the transfer trailer's 4 stage telescopic cylinder.

e. A Stauff 12" or County approved equal sight glass mounted in the reservoir must be provided to indicate the full level as well as indicating the low oil level mark.

f. All input and output locations on the tank shall have proper reinforcement where they meet the tank to prevent metal damage from stress or fatigue due to vibrations.

g. The hydraulic system shall be designed to include a low oil level sensor in the hydraulic reservoir that shall cause the PTO to deactivate when hydraulic oil is low preventing pump damage from a low oil condition.

3.24 HYDRAULIC FILTRATION: NO SUBSTITUTION

a. Stauff RTF48G10BTT25S2N-V or County approved equal 100 GPM in-tank return filters with -24 SAE o-ring ports which shall be properly mounted to top of the tank per manufacturers installation instructions and recommendations. Each return filter assembly shall have a Stauff CL-12 return line pressure gauge.

b. An Eaton Vickers OSS or equal in tank suction strainer with a 3 PSI cracking pressure bypass. The filter shall be mounted inside the tank to provide the maximum flow and prevent aeration.

c. An easy to access and operate , 1-1/2 inch full port ball type shut off valve is required on the suction side of the reservoir as close as possible to the tank.

d. The suction hose must be 1-1/2 S.A.E. 100-R4 rated.

3.25 SUPPORT BRACKET

Must be provided for all hydraulic hoses and air lines.

a. A 3/16" steel support bracket must be bolted to the chassis behind the hydraulic reservoir. Final design and approval will be at the preconstruction and/or at prototype inspection.

b. Grip strut type 14 gauge walkways must be fabricated and mounted onto and/or across the frame members of the tractor. Final design and approval will be at the preconstruction and/or at prototype inspection.

1. From the rear of the hydraulic reservoir to the front of the fifth wheel. The length to be as long as possible to final configuration to provide the maximum working platform.

2. On the area directly behind the cab and to the left of the left frame covering the battery box (if installed), the size of the walkway is approximately 19 inches wide by 1 inch high, length to be as long as possible to safely facilitate driver access from cab step to working platform.

3. No Less than two (2) all LED work adjustable lights to provide substantial and adequate lighting to assist the driver when backing up to connect to a trailer and connecting hydraulic hoses. On light is to be mounted on each side of the bracket as close as possible to the end of the bracket.

3.26 HYDRAULIC RELIEF VALVE

A Pilot Type hydraulic relief valve mounted on the hydraulic pump and set to manufacturer's specifications shall be provided to prevent damage or rupture to the hydraulic system.

a. All exposed pressure hoses must be shielded to prevent hydraulic fluid spraying around in case of a hose rupture.

3.27 ENGINE OVERSPEED

Must be provided by engine electronics; **NO SUBSTITUTION.**

a. Must be preset by the manufacturer to meet PTO, hydraulic pump and application needs.

b. PTO must be configured to disengaged at 5mph and greater.

3.28 BACK-UP ALARM

a. Velvac, Preco or other equal self-adjusting volume type, meeting current SAE loudness standards and produce a clear intermittent sound conforming to applicable OSHA standards.

b. The alarm shall be activated when the vehicle transmission selector is placed in the reverse position.

3.29 PAINT AND RUSTPROOFING

The entire unit(s) inclusive of whatever body may be requested shall be prepared and painted Two-Tone White and Black as designated in (c), (d) or (e) below. **NO SUBSTITUTION**. All structural elements shall be thoroughly cleaned to remove all grease, oil and foreign matter. Weld splatter, slag, flux and rust or corrosion shall be completely removed by chipping, wire-brushing, shot blasting or sand-blasting prior to priming and painting.

a. PRIMER - Only the highest quality rust inhibiting primer specified for use with the designated finish coat shall be used.

b. FINISH COAT - Shall be smooth, hard and free from imperfections. The unit(s) shall be finished in White with the running boards, bumpers, hydraulic platform and rack, frame assembly, finished in Black. The wheels must be powder coated black. No outside metal surface void of paint shall be accepted.

c. P.P.G. Durethane 750/1000 Basecoat Clear coat process shall be accepted for use on this vehicle.

d. The Imron 6000 or Imron Elite Basecoat Clear coat process shall be accepted for use on this vehicle.

e. Other primer and finish coat applications of equally high quality that may be approved by the County. Alternate color choices to approved coating systems may be named by the County at a later date for use by Water and Sewer, Aviation, Public Works or other departments that may require specialized colors or applications.

f. In Paragraphs (c), (d) or (e) above, the County requires the unit(s) to be guaranteed against peeling cracking or oxidation for a period of one (1) year from date of acceptance.

g. The awarded Bidder shall be responsible for the application of rust and corrosion protection and shall warranty the entire vehicle for a five (5) year period. The warranty shall protect all underside surfaces excluding fiberglass and driveline. All closed in areas such as roof ribs, body posts, support pillars, rocker panels and all other areas subject to rusting from the inside out, that have not been treated at the time of manufacture, shall be drilled, treated and plugged as required. The warranty shall require the complete repair of any rust or corrosion damage that occurs in the five (5) year warranty period. The awarded Bidder shall provide any periodic service required to maintain the warranty period.