KNOW YOUR LEASE AREA

June 29, 2008

Jack DeTore

WHY YOU SHOULD

Each lease contract must have the information that identifies the lot and what its size is so that the bonus and royalties can be paid based on acreage as well as the rate per acre. Early proposed leases carried estimates of lot size, ready for signing, but the lot sizes were generally too low. Since the negotiated bonus for signing and for subsequent royalties are based on acreage, it's desirable to make sure that the size quoted is accurate. A hundredth of an acre can represent from 100 to 200 dollars depending on the final negotiated bonus rates per acre. Your committee is attempting to get the areas computed more precisely by the operators than we originally were offered. Nevertheless, it's still the responsibility of the lessor (us) to be in agreement with the numbers on our lease contract. Although the lessee (operator) has a better way to calculate the numbers through their technical staff, we still have to spot check them. Each homeowner should try to have an idea of his lot's approximate acreage and any additional allowed area such as a portion of the adjacent street. While your estimate may not be as precise as the lessee's you would then have an estimate showing whether the area offered by the lessee is acceptable. Provided below are some estimating methods you can use. Areas generally will be calculated first in square feet then converted to acreage by dividing by 43,560. Lot size and street add-on estimating methods are treated separately below.

YOUR LOT AREA – the simplest way. A method for getting your lot area, even for a complex of shape, is provided online by a City Of Arlington (COA) website. My good neighbor, Joyce Dreslin, has outlined clearly the steps to use. This is the easiest way to get a fairly accurate, though "unofficial," calculation of the square footage of your lot without the addition of adjacent street or alley areas. For purposes of the gas leases, square footage to the middle of your streets or alleys may be added on and the total converted to acreage. To find your lot square footage, you'll need a computer to access the COA website and your street address. You can then print the result for your records and use it to determine if the number used as the basis for your gas lease is accurate. Here is a step-by-step method:

1. Go to the website: http://www.ci.arlington.tx.us/gis/interactiveMapping.html. This page shows the Arlington logo and title Geographic Information Systems Interactive Mapping.

2. Scroll down to the bottom of the page below the heading Interactive Mapping Applications, and click on the title ArcIMS Multiservice Viewer after the word NEW. It turns blue, and after a moment to load data, presents a colorful map of Arlington with a row of icons above the map.

3. Click on the second icon. It's just to the right of the red "i" icon. A gray area will appear in the lower left that says Locate Address.

4. You must enter your address in the four spaces provided. The first is Bld No where you type in your house number. The second, DIR, is for street directions, and you may leave that as "Any." In the third, enter the main word or words of your address without the Rd., Ln., Tr, etc. That is the final piece of information, and it goes in the last space and can be selected from the pull-down menu.

5. When the four spaces are filled in, click on the Locate button just above.

6. The program checks its database and presents a choice of addresses in blue to the right of the information you gave it. Click on your address from this blue list.

7. The program takes a moment while flashing "Retrieving Data" and then "Retrieving Map." A blue-outlined drawing of your lot appears. Below it, in a gray area labeled "Tax Parcel" is a line of information. You will find the square footage of your lot in the second box titled "Area".

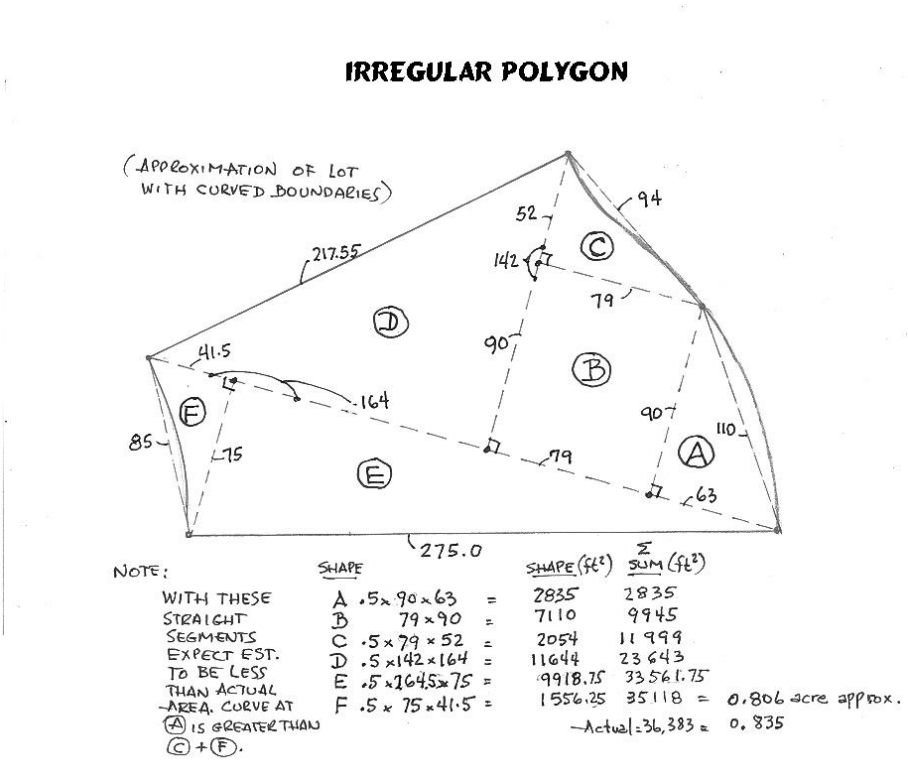
YOUR LOT AREA – pencil and paper

Rectangular Lot - The simplest lot, rectangular, would have two parallel sides and two parallel front and back borders. The area is simply the width times the depth. Note that a diagonal forms two identical triangles so each has an area of ½ the width times the depth. A lot that's 75 ft wide by 120 ft deep has an area of 9000 square feet. Divide this by 43,560 and get 0.2066 acres. At $15,000/acre this would yield a bonus of $3,099.17. If we got lazy and rounded the answer to 0.2, the bonus would be almost $100 less.

Trapezoidal Lot - A more likely lot shape would have two sides parallel but of different length. The area is then the average of the two different lengths times the distance between them.

Irregular Polygon Lot - Here is where we get out the tools besides a calculator. Think of the irregular polygon as having several sides, not necessarily parallel or equal in length. Actually, this becomes a good way to put a box around your lot that may have curved borders. The graphical method described here is approximate depending on how curved

boundaries are measured. It avoids having to work with protractors and trig tables and can be surprisingly close. I have found that homeowners lot survey copies are generally on letter size pages and are scalable. The scale factors I've found are 1" = 20 ft, or 30 ft, or 40 ft. If you have an "engineer's" scale, it'll include these scales. A triangle template for constructing a right triangle is needed. Letter size tracing vellum is also needed. Office supply stores usually have these. Assuming your ruler has a scale that matches the survey, align the vellum sheet on the survey and trace the lot borders with a sharp pencil. If you have a curved border, just approximate it with straight lines using one or more intermediate points. Using the proper scale factor ruler edge, measure the borders you drew and confirm that you can get the same length of a long border that's on the survey. Now draw an interior line across the farthest corners. This base line should then be used to construct perpendiculars to the remaining corners of the lot as shown in the example below.



Close off any resulting trapezoids to form a right triangle and a rectangle. Measure all the lengths. Label each interior triangle or rectangle space (A thru ...) The next step is to calculate the area for each right triangle and rectangle and sum the areas to get the total approximate area of the survey

in square feet. It will be over or under based on how any curved borders were approximated with straight lines.

YOUR LOT AREA – the CAD way Where lot shape is unusual with curves and non-parallel borders, it may be justified to use a CAD (Computer Aided Design) approach. In this case, borders of the lot must be detailed on an authoritative source such as the survey or neighborhood plat. Each straight line segment of the lot is then entered into the CAD database as starting "x and y" coordinates, line length and NS-EW headings. Curves are defined by center x and y coordinates, radius, and starting and ending heading angles. Dimensions are generally in hundredths of a foot and angles in degrees to four places (deg/min/sec). With careful data entry, lot perimeters will close to within fractions of an inch and the CAD software can then automatically compute the perimeter and area of the closed region. This approach is best performed with a technical staff and on contiguous regions of lots and streets so that neighboring properties make use of common borders and latest border adjustments. Neighborhood plats are generally better sources, therefore, than individual lot surveys for the CAD approach. Some homeowners' lots have been analyzed this way and will be available to spot check values provided by the lessees tech staff. To do more CAD analyses to provide specific spot check requests by homeowners would require volunteers willing to use the computer to do this kind of thing.

Many folks have had a professional do the CAD for them for peace of mind where their lot and street shape is complex. A good service is by Worthy Surveying (you may want to contact others). Their contact is:

Worthy Land Surveying Inc.
Mark Worthy & Mitch Worthy
Phone & Fax 817-295-8747

Area determinations standard lot & block platted subdivisions	$25.00
Area determinations with exhibit ' '	$50.00
Area determinations with exhibit and certified (seal)	$75.00

(Please Note: Prices were quoted Spring 2008 and may be different now. JAD)

ADDING STREETS

Generally, the street right of way (ROW) abuts the lot lines on each side of the street. A typical neighborhood street ROW is 50 ft wide. A typical paved street within that ROW is 28 ft wide to the back of the curbs. So the

typical street ROW contains space between the curb and the lot frontage line. The area rules provide the homeowner with an area that includes a portion of the adjacent street (plus an alley if the lot has one). Generally, the area rule states “to the centerline of the adjacent street(s)”. So typically, the sides of the lot will reach out 25 ft farther from the front lot line. “How” this reaching is done is described below.

Straight Street - Where the street is straight, the “reach” lines are perpendicular to the street centerline and meet the lot front corners. So the two reach lines are parallel. Even if the lot sides approach the street at an angle, the reach lines will still be perpendicular to the street centerline between the lot and the straight street and will be parallel to each other. The add-on area is typically half the width of the ROW times the distance between the reach lines. As an example, a lot having 75 ft frontage on a 50 ft wide street ROW will have an additional area of 75ft x 25 ft or 1875 sq ft of area (0.0430 ac) worth an additional $645.66 bonus @ $15,000/ac. In addition, for corner lots, include the portion of the intersection area defined by sides being 1/2 the ROW of each adjacent street. So, in addition to half the ROW of each street adjacent the lot lines, there would be a piece of the intersection. Example: If both ROW are 50' wide and at right angles, the portion in the intersection will be a square 25' on a side; an area of 625 sq ft.

Curved Street - The principle is the same for a curved street in that the reach lines are also perpendicular to the street centerline The other end of the reach lines meet the corners of the abutting lot line. The lot frontage will be greater or smaller than the street centerline depending on which way the street curves. The reach lines between the lot frontage corners and the street centerline are not necessarily extensions of the lot sides because the center of the street’s arc is what counts. Since the reach lines are perpendicular to the street centerline they may not focus to the same center that the lot side lines use. Unless one is willing to get into trig functions and geometry analysis for maximum accuracy, a graphical method may be the simplest way to approximate the curved street area add-on. To do this, break the lot frontage arc into straight segments, measure them, and sum them to get an approximate length for the lot frontage arc. Break the street centerline between the reach lines into segments. Measure and total the length of straight segments along the centerline. Average the two total lengths and multiply that average by half the width of the street ROW. The result is the area, typically, to be added to the basic lot area to get the approximate extended lot area.

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Circular cul-de-sac - The “centerline” of a circular cul-de-sac shrinks to a point. So now the reach lines from a lot on the cul-de-sac emanate from the center and head for the lot corners at the periphery of the cul-de-sac ROW. Where a straight street segment joins the wider cul-de-sac, one lot corner may reach to the center of the cul-de-sac circle and the other to the straight street centerline. Estimating your portion of the circular cul-de-sac “pie” is best done by estimating the portion of the circles area represented by your lot’s portion of the circle perimeter. Surveys generally show this angle of the “pie slice.”

For any questions or comments about this article, email me at: jadetore@tx.rr.com