

Final Report

**A Transferable
Development Rights
Program for Land
Preservation**

**Prepared for
Collier County, Florida**

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Introduction

The conversion of lands from one use to another has been a matter of concern in many areas around the country. The economic pressures for converting from one, less intensive use, to another, more intensive, are well known.¹ Land tends to be more valuable in development than in farming or laying fallow, thus converting from low value to high value uses is rewarded with profit. Regulatory measures, such as zoning, can retard and even stop conversion. However, such regulatory measures have their own problems. The most obvious consequence of conversion ending regulatory programs is a resulting loss in land value when development potentials are reduced or eliminated. Thus, land-use planning agencies find themselves in the middle of a conflict between two compelling interests. On the one hand, there is a desire to protect and preserve land and to prevent, or at least control, certain environmental and social costs commonly associated with land conversion. On the other hand, development regulatory bodies are faced with a philosophy of property rights, which holds that regulations that reduce the value of individual's land is an unconstitutional taking of private property.² Local governments are caught between a duty to protect public health, safety and welfare and a duty to justly compensate landowners whose property has been taken by the regulations that achieve the protection to public health, safety and welfare.³

There has been a great deal of experimentation around the country with land management techniques that retain lands in existing low intensity uses without destroying the developmental values of that land. Most notable are purchase of development rights (PDR) and transfer of development rights (TDR).⁴ Both of these programs share the characteristic of separating development rights from the other use rights associated with the land. For PDR, the development right is purchased and extin-

¹ See Marion Clawson, *Suburban Land Conversion in the United States*, Baltimore: Johns Hopkins, 1971, for the seminal discussion of the process and economics of suburban land conversion.

² See *Pennsylvania Coal v Mahon*, 260 U.S. 393 (1922), where Justice Holmes wrote that "government hardly could go on if to some extent values incident to property could not be diminished without paying for every such change in the general law. . . . **The general rule at least is that while property may be regulated to a certain extent, if regulation goes too far it will be recognized as a taking.**" Emphasis added.

³ Julian Juergensmeyer, J. C. Nicholas and B. D. Leebrick, "Transferable Development Rights and Alternatives After *Suitum*," *The Urban Lawyer*, Vol 2, Spring, 1998.

⁴ Mitigation is beginning to receive attention as a complementary means of achieving the preservation of environmentally important areas. See , J. Nicholas, J. Juergensmeyer and E. Basse, "Perspectives Concerning the Use of Environmental Mitigation Fees as Incentives," *Environmental Liability*, Volume 7:2 and 7:3, 1999.

guished, i.e., not used. In the case of TDR, the right is transferred and the development that would have been undertaken on the subject land is undertaken elsewhere. In both instances, the development value of the land slated for preservation is protected.

The things to be called Transferable Development Rights herein go by many different names. In the New Jersey Pinelands they are Pinelands Development Credits (PDC). In Dade County, Florida, they are Severable Use Rights (SUR). In Suffolk County, New York, they are known as Pine Barrens Credits (PBC) while in Montgomery County, Maryland, they are just plain old TDR. Regardless of what they are called, these rights share the common characteristic of facilitating the transfer of development from one place to another. This report will use TDR, transfer of development rights, to describe the policy.

The possibility of using transferable development rights in Collier County is presently before the people and elected officials of the County. The study reported herein analyzes the potential for TDR to address matters of land conservation within the Rural Fringe of the County. TDR may or may not be a good idea for Collier County. An important step in the process toward answering the policy question is determining whether TDR is economically feasible. This study inquires into that feasibility and reports on how a TDR could address the conservation of Rural Fringe land.

II. Transferable Development Rights

A. Background

Many communities have established some type of transferable development rights (TDR) program. Few would be considered successful.⁵ While the record for TDRs is, at best, spotty, those programs that have been successful clearly demonstrate that TDR can address difficult problems resulting from land management programs. Carefully designed TDR programs can “mitigate the impact of regulation,”⁶ when a developing community seeks to maintain land in low intensity or low value use. This report will discuss the background of successful TDR programs and, using the lessons learned by successful programs, set out a TDR program that is responsive to the conditions within Collier County.

The concept behind transferable development rights is simple. Title to real estate or property ownership, under the bundle of rights (sticks) theory, consists of numerous components that may be individually severed and marketed, such as the sale of mineral or oil rights. The right to develop property to its fullest potential is one of these sticks.⁷ The TDR system simply takes the development stick for a piece of property and allows it to be transferred or relocated to another piece of property.⁸ Typically selling some defined development potential of one piece of property, the sending site, to some other entity for use at some other piece of property, the receiving site, accomplishes the transfer.⁹ The transferred development potential may be measured in any one of a number of ways, such as floor area ratio or residential dwelling units. Once the transfer has occurred, most TDR systems require a legal restriction on the

⁵ Depending on what type of TDR is being considered, there are more than one hundred TDR programs in existence. See Richard Roddewig and Cheryl Ingram, *Transferable Development Rights Programs: TDRs and the Real Estate Marketplace*, 401 American Planning Ass’n Advisory Report (1987). Also see Robt. Coughlin, “The Protection of Farmland: A Reference Guidebook for State and Local Governments,” (1981), Rick Pruetz, “Saved by Development,” (1997) and American Farmland Trust, “Survey of Agricultural Preservation TDR Programs,” (1998).

⁶ Justice Brennan used this terminology when describing a TDR in *Pennsylvania Central Transportation Co. v. City of New York*, 438 U.S. 104, 98 S.Ct. 2646. In *Suitum v Tahoe Regional Planning Agency*, 520 U. S. 725, 738 (1997), Justice Scalia wrote, “TDRs can serve a commendable purpose in mitigating the economic loss suffered by an individual whose property use is restricted, and property value diminished, but not so substantially as to produce a compensable taking.”

⁷ See Carmichael, Donald M., “Transferable Development Rights as a Basis for Land Use Control,” 2 Florida State University Law Review 35 (1974), page 37.

⁸ Roddewig & Ingram, *Supra*.

⁹ There is no need to actually transfer ownership of the rights. However, the concept is discussed in this manner to make sure that third party transfers are facilitated.

sending site,¹⁰ prohibiting any future use of the transferred development potential.¹¹ The receiving site is then allowed to increase its allowed development potential by the additional number of dwelling units or floor area to which it is entitled as a result of the TDR transaction.

TDRs will derive their value from receiving sites. The receiving areas are where the transferred unit will be sold, and the value of that unit will be based upon its location, location and location. If development is valuable in receiving areas, the right to transfer development to such areas will be valuable. Likewise, if development is not valuable in receiving areas, the right to transfer development to such areas will have no value.

The goal of TDRs is to use market forces to maintain economic values of lands being regulated by capturing a portion of the development value of lands not so regulated. The value of developed lands is largely due to the desirability of the community. A community that is a desirable place will lead to high land and developmental values. Likewise, undesirable communities result in low or even no land values. For a community such as Collier County, the quality of past development together with the “ambiance” of Collier County have resulted in very high values for both developed and undeveloped land.¹² These factors create the conditions for high values, while the market forces of supply and demand implement those values. The demand for a Collier County location is a direct result of the quality of the community and the supply of developable land in Collier County is diminishing. These forces combine to create a situation of ever increasing land values and ever increasing pressure to develop the remaining land and to develop that land more intensively.

There are a number of variations on the basic theme of development rights acquisition. An example is the dedication of development rights to a land trust or similar organization with the owners realizing a tax deduction for the donation? While there are a number of precise means, the common characteristic is that the development rights are severed from the land. The land will retain all rights not specifically removed. In the case of agricultural preservation easements, land will retain all rights to farm. The conservation easements that sever the development rights can be structured so that economically viable uses, such as agriculture, may be left after the development rights have been severed, or, alternatively, all uses of the land could be removed. The retention of uses can be an important factor in the ultimate success or failure of a TDR program. If all economically viable uses are removed, there is a problem of maintaining the now fallow land. Alternatively, leaving too many uses may defeat the conservation objective sought.

¹⁰ Usually by the recordation of a conservation easement.

¹¹ Costonis, John J., "Development Rights Transfer: An Exploratory Essay," 83 Yale Law Journal 75 (1973) at 85. The practice is to differentiate “development” from other uses of land, such as agriculture. While “development” is no longer permissible, all uses not so restricted remain.

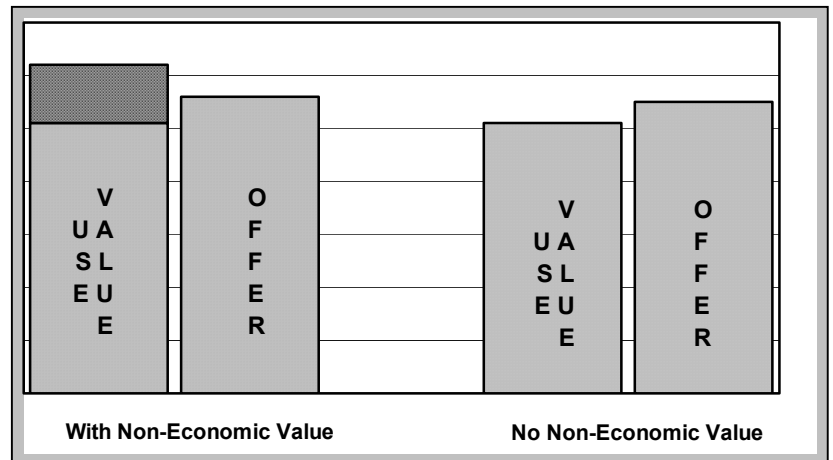
¹² Collier County land values will be discussed in following sections.

A program of TDR is an economic policy. It is a policy that attributes severable development rights to certain properties, called Sending Areas, and modifies development regulations so that the severed development rights may be used in Receiving Areas. As a precondition for success, this economic policy must be feasible. Within the context of this study, feasibility will have a working definition as having the potential of profit from transferring development from sending to receiving areas.

B. The Economics of Land Value

Land has two fundamental values. The first is value in use and the second is value in exchange.¹³ The value in use is that value returned to the owner from the existing uses of the land. This value can be both economic and non-economic. The value in exchange is what someone else would pay for the land. Generally, when the value in exchange exceeds the value in use, the property will be sold.¹⁴ The primary determinant of the value in use is the economic return received by the owner.¹⁵ However, many properties also provide non-economic returns, especially when those lands are environmentally sensitive. These non-economic returns are typically in the form of an enhanced “quality of life,” enjoyed by all.¹⁶ When environmentally sensitive land is converted from its natural state, the owner benefits from an economic gain but also must bear any costs associated with the sale, both economic and non-economic. In many communities, the conversion of land involves a cost to be borne by the community as a whole. This cost is felt as a loss in the “quality of life.”

Owners will place a value on their land. They may do this subjectively or those values may result from appraisals or similar objective data. Regardless of how, owners have a sense of the worth of their land. When market values exceed owners’ sense of worth, the land will be sold. Whether the land is actually sold is not as much a matter of the price offered as it is the owners’ sense of the worth of the land. In this graphic we see two different situations. In the first, the owner attaches some non-economic value to the land with the result that a sale does not happen even though the offer is higher than that justified by the existing economic use. In the second instance the sale would occur because the owner did not



¹³ This dichotomy was first explored by Aristotle in *Ethics*.

¹⁴ Speculative motives notwithstanding.

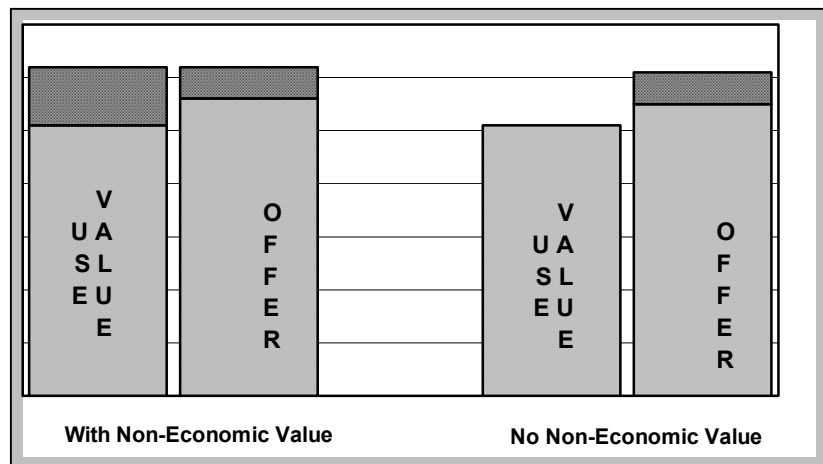
¹⁵ The economic return can be a monetary return or an in-kind return such as the rental value of a person’s own home.

¹⁶ This is known as an *externality*. In this instance, it is an external benefit. This benefit is characterized as external because it is a benefit received by others and it results from no intention of the landowner. The other type of externality is an external cost. This is a cost borne by others that was not the intention of the owner. The characteristic that makes such benefits or costs “external” is that the values of such benefits or costs are not capitalized into the price of land.

attach any non-economic value to the property. The point is that the offer – the value in exchange – was not the sole determinant of the sale. The opposite is also true. Bidders may go beyond the economic value of property for non-economic reasons. In both instances prices – the values in exchange – will appear to be beyond the underlying use value of the land. Of necessity, buyers will have to buy-out both the economic and non-economic values if they are to acquire that land. It would follow that only those buyers who attached the same or higher non-economic values to that land would acquire the property. In this manner subjective values are capitalized into market prices of land.

This market process creates a problem. Buyers pay prices that reflect all factors relating to the land. Any potential buyer who places little or no value on non-economic qualities will lose out in the bidding process to those that do value such qualities. The resulting capitalization of those qualities into market values means that if those qualities were to be lost, buyers would suffer a loss both in the subjective and objective values of their land.

The adjacent graph depicts a situation where a buyer made an offer that covered both the economic and non-economic values of a property. The second set of columns show what would happen if non-economic values were lost. The net effect is that the new owner would incur both economic and non-economic losses as a consequence of the loss of the particular quality that was the source of the original non-economic value. A simple example makes the point. A parcel that offered a view of some spectacular scenery would have the value of that view capitalized into the price of the land. If that view were subsequently lost, the owner would incur both economic and non-economic losses.



The community of Collier County clearly has a substantial number of properties with values that originally were subjective in nature. These subjective values were based upon the “quality” of the community. The necessity of offering prices (values in exchange) that exceeded the owner’s value in use resulted in the capitalization of those subjective qualities into objective market prices. Only potential buyers that assigned equal or greater value to those various qualities would buy Collier County property. These actions both confirmed the existence of those qualities and created market val-

ues beyond more narrowly defined values in use. In order for these higher values to be maintained, the “quality” of Collier County also must be maintained.

C. The Economics of Density

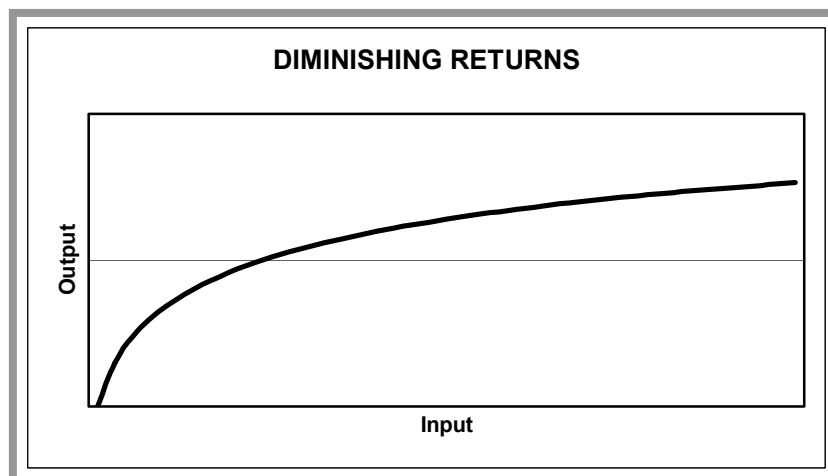
When asked what determines the value of land, “location, location and location” is the standard, almost knee-jerk, response. Of course location is critical to the value of a parcel of land, but once location is fixed, other factors come into play. The most important of the other factors is the productivity of the land. All other things being equal, i.e., location, the more productive land will command higher prices than the less productive. The precise value of a parcel of land would be a function of the land’s yield per unit of land, usually an acre. For agricultural land this is commonly measured in bushels per acre, or some other recognized measure of output. The more goods that can be produced on a parcel of land, the more valuable that land. The same economic forces apply to urban land.

The productivity of urban land is basically the same as agricultural – yield per acre. Of course the units yielded from urban land are different than agricultural and are measured in dwelling units or square footage of floor area rather than bushels per acre. But the basic point that the more that can be produced on a parcel of land the greater the expected value of a unit of land remains true for both agricultural and urban land. Unlike agriculture, the production of more urban product per unit of land tends to change the nature and value of the product. In agriculture the 100th bushel produced on an acre would have the same market value as the first or the fiftieth. The same is not true for urban products such as residences. The market tendency is for unit value to decline with density.¹⁷ Thus, in an urban market the productivity of the land must be viewed together with the market for the various types of units capable of being produced on the land. Land capability is a function of the physical characteristics of the land and the legal restrictions on the land. Thus either physical limitations or legal restrictions will work in conjunction with market forces to determine the productivity of land in terms of production per acre – density.

In those circumstances where the market demands less density than both the physical limitations on the land and the legal restrictions could allow, the market is the sole determinant of density. When the market demands and legal restrictions would allow higher density than the physical limitations will allow, attempts to modify those physical limitations will occur until either the market or legal limits became the upper limit. When legal restrictions allow less density than the market demands and physical limitations would allow, requests for rezonings and similar types of regulation changes will follow. Only when the market is the limiting factor will equilibrium prevail.

¹⁷ See Arthur O’Sullivan, *Urban Economics*, 3rd Edition, Chicago: Irwin, 1996, p. 238. This commonly accepted principle is demonstrated for Collier County in the following section.

In a residential land market the general tendency is for value to increase per land unit (hereafter referred to simply as acre) with density but at a decreasing rate. That is, each additional unit of density will add less to total value as density is increased. In economics this is known as the *Law of Diminishing Returns*.¹⁸ A typical per acre value with respect to residential density would be as shown in Figure 1. In this figure value per acre is increasing with additional units



of density, but it is clearly increasing at a decreasing rate. If this process of increasing density on a given unit of land is allowed to continue, it will eventually lead to a declining total value as shown in Figure 2. This situation would occur because each additional unit of density was of negative value, thus detracting from parcel value. This type of negative value would occur because the development would be so dense that buyers would offer less to buy or rent because of excessive density. Of course, no rational person would knowingly increase density to such a level. Rather, they would cease density increases at levels that maximized total values.

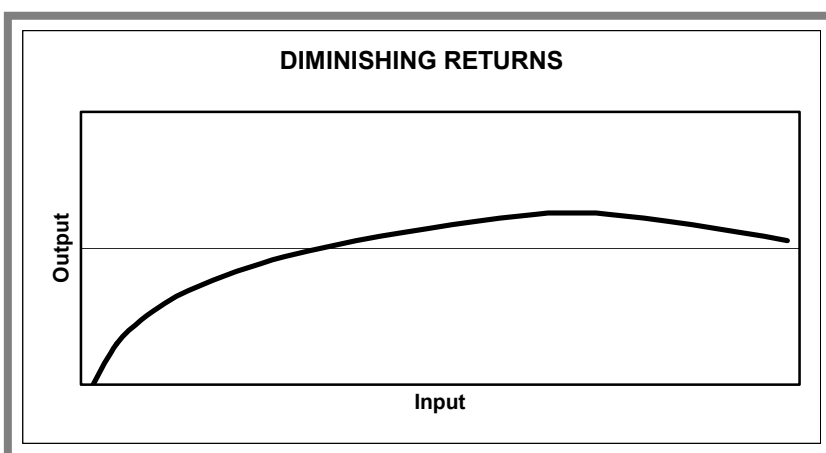


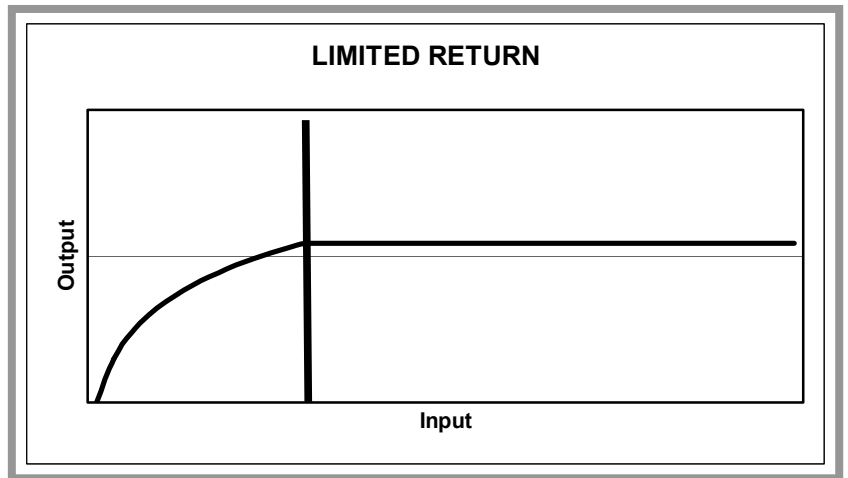
Figure 3 shows a limiting factor. A limiting factor is introduced that results in less than market density and thereby limiting value and returns. Of course, if the limit could be eliminated or raised, density of development would rise and so also property values and returns. If this limitation were physical, such as being flood prone, modifying the land by providing drainage could result in increased value. Likewise, values could be increased by relaxation of any regulatory constraints that limited density below what the market would set. In the situation depicted in Figure 3, it would be very much to the advantage of the property

¹⁸ See any edition of Paul A. Samuelson, *Economics*, New York: McGraw-Hill, numerous years, for a full and in depth discussion of the law of diminishing returns.

owner to attempt to increase the density of development. This is the prime situation for TDRs. It is an unfortunate fact of modern life that the market will tend to accept more density than most community will accept.

Communities, thus, enact various regulatory programs that limit development densities to less than what the market would accept and reward. Various petitions result with the goal being to increase permissible density up to what the market would accept. TDR presents a way to increase densities and also economic returns in those situations where allowable

densities are less than market densities. In situations where market densities are at or below permitted densities, TDRs will have no economic feasibility and thus no ability to achieve land preservation.



The material presented and the points made here are commonly known. This review is presented in order to set the stage of an analysis of the role of density in the Collier County urban land market. The general theory of land economics would suggest that density of development would be a significant factor in the setting of Collier County urban land values. Furthermore, theory would suggest that the incremental or marginal value would decline with density. We can turn now to the Collier County land market to discover the precise land economic relationships within Collier County.

III. Empirical Results

Several components of Collier County real estate sales were combined to create what is called the Total Sample. The Total Sample is made up of the sale of unbuilt-upon properties within the study area.¹⁹ For purposes of this study, retail lot sales are those sales containing a single buildable unit and bulk lot sales are those with two or more buildable units (or lots) within the parcel. The components of the sample are:

SALES INCLUDED IN TDR SAMPLE

Retail Sales:	
Urban Area Retail Lots	114
Rural Area Retail Lots	541
Total Retail	655
Bulk Sales:	
Urban Area Bulk Sales	185
Rural Area Bulk Sales	285
Total Bulk	470
Total Urban Sales	299
Total Rural Sales	826
Grand Total	1,125

All of the sales utilized are taken from Collier County public records. These sales occurred between January 7, 1998 and September 4, 2001.

All markets are rational. The problem confronting the analyst is to comprehend the rationale of a particular market. The market of concern is the Collier County land market. The particular market is the non-Gulf influence area and within the Naples market area. This includes both urban and rural properties. The goal of this inquiry is to project the value of increasing the intensity of land use within certain receiving area parcels. This value will be a function of the market valuation of the resulting increased land use intensity. These valuations will have to be imputed from surrounding areas. Thus, sales of buildable properties in surrounding areas are analyzed in order to project the economic value of increased intensity on receiving area properties.

The study area is broken out into Urban and Rural and then by Retail and Bulk. Of course there are the sub-classifications – Urban Bulk, Rural Retail and the like. It is

¹⁹ At the outset there were five sub-areas within the sales study area: the Rural Fringe Area, the Urban Area, Orange Tree, Immokalee and Bayshore. Immokalee and Bayshore are both areas that appear to have ample density and limited current pressure to increase density. While Orange Tree is a very active market, increasing intensive of development in existing developed areas appears to be economically infeasible. Therefore only sales in the Rural Fringe and Urban Areas will be analyzed.

expected that these markets would be fundamentally different. It is easy to see that there are substantial differences among the sub-categories of property. Whether

	Bulk	Retail	Rural	Urban
Total Sales	\$516,849,150	\$44,084,350	\$108,934,500	\$451,999,000
Total Acres	27,140	1,929	20,756	8,119
Total Units	34,773	655	4,325	30,331
Average Parcel Price	\$1,099,679	\$67,304	\$131,882	\$1,511,702
Price Per Acre	\$19,044	\$22,856	\$5,248	\$55,670
Price Per Unit	\$14,864	\$67,304	\$25,187	\$14,902

the observed differences are fundamental or merely reflecting differing conditions will be discussed below.

The various sales are analyzed with multiple regression. This is a statistical technique that correlates one set of data, known as the dependent variable, with one or more independent variables. The objective is to test whether there is significant correlation between the dependent variable and the independent variables. The reliability of the model is measured by a statistic known as the Correlation Coefficient (or Coefficient of Multiple Determination) – R^2 . This is a percentage measure, although statistical convention does not convert it to an actual percentage but leaves it in decimal form. The Correlation Coefficient is calculated by contrasting the predicted (or estimated) value of dependent variables against the actual of those variables. The extent to which the predicted values are consistent with the actual values, measured as a percent, is the R^2 . For this reason, this statistic is commonly known as "goodness of fit," meaning the extent to which the statistical explanation offered "fits" with the actual values observed. The higher the value of R^2 , the better the fit. The R^2 reported herein are adjusted for sample size and thus the notation is shown as " R^2 Adj."

Two other statistical measures are employed herein. The first is the t-Statistic.²⁰ This statistic measures whether the coefficient of an individual independent variable is significantly different from zero. If the coefficient is significantly different from zero, then it is accepted that the independent variable affects the dependent variable in proportion to the magnitude of the coefficient. The correlation coefficient, R^2 , assesses the explanatory power of all independent variables collectively while the t Statistic is relevant to each individual variable. For samples of the type analyzed, t Statistics between 1.796 and 2.624 are required. The lower t Statistic is associated with the 95% level of significance and the higher is 99%. t Statistics are shown above each coefficient in parentheses. A quick rule-of-thumb is that a t Statistic must be approximately 2 before it can be accepted.

Another measure is the F Statistic. The F Statistic assesses the degree of co-variation between the dependent and independent variables. For the type of data analyzed, F

²⁰ Sometimes called the T-Ratio. Please note that the lower case "t" is not a typo.

Statistics of 3.09 at 95% and 5.07 at 99% are required. The F-Statistic is an overall test of the multiple regression model.

A total of three statistics are used: (1) R^2 which measures the percent of variation in the dependent variable explained by the variation in the independent variable(s); (2) t Statistic which measures whether an individual independent variable contributes to the explanation of the variation in the dependent variable; and (3) F Statistic which measures the degree of co-variation.

Multiple regression is used to assess the factors that influence the value of land sales. The items presumed to influence parcel sales price are: the number of acres within the parcel; the number of dwelling units authorized by existing zoning; the amenities available to the parcel, whether the parcel is approved for development, and whether the parcel is within the urban area. No other factors are given consideration. In the following sections the parcel sales within Collier County are analyzed. The objective is to estimate the value of an additional unit of (residential) development. This value will be used as a basis for projecting the consequences of permitted density alternatives.

To readers unfamiliar with statistical and multiple regression analysis this may be difficult. Rather than working through the individual equations, a reader may wish to simply employ the t Statistic rule of thumb (it should be approximately 2) and an F-Ratio rule of 5 or higher. There is no set minimum value for R^2 Adj. Rather, the closer to 1 the better. But for the type of analyses undertaken herein, values of R^2 Adj. of 50% (.5) are acceptable.

This analysis is concerned with the incremental or marginal value of allowable density (per acre). In order to establish a basis for this estimation, 1,125 Collier County land sales discussed above were analyzed. The expectation is that per acre values will increase with allowable density and per dwelling unit values will decrease with allowable density. Of course, it is expected that both per acre and per parcel values vary given the presence or lack of amenities. The amenities included herein are water frontage (non-gulf), view frontage and being within a gated community. The presence of such amenities is aggregated into a single variable labeled "Amenity." Given the nature of the land market, it is expected that the interactions among these variables will be logarithmic²¹ rather than linear.

It is not possible to directly measure the worth of amenities. In this analysis each amenity is measured simply on the basis of whether or not it exists for each particular parcel. The regression model will then estimate the contribution of such amenities to the sales price of the lot. The objective is not to estimate amenities values. Rather, the objective is to adjust for amenities so that the fundamental land economics may be assessed. The binary (1 or 0) inclusion of a characteristic is known as a "dummy

²¹ Natural logs are used rather than the base 10 logs. Natural logs are used because natural logs (base 2.72) are more applicable to financial data than are logs base 10.

variable.” It is “dumb” in that the value 1 indicates that the characteristic exists and the value 0 indicates that it does not exist. The same approach is used to incorporate whether the parcel is approved for development or not and whether the parcel is located in the rural or urban area. For a parcel of land in a development that had a golf course, was located within the urban area and was approved for development, the values of Amenity, Approved and Urban would all be 1, indicating the presence of that quality.

The general model used to explain variations in parcel prices is:

$$\text{Parcel Price} = f(\text{Acres, Units, Amenities, Approval, Location, Time})$$

This equation incorporates an hypothesis that the sales price of a parcel of land within Collier County will be a function of the size of the parcel (measured in acres), the allowable density (measured in maximum allowable dwelling units permitted by zoning or approvals), the amenities available (golf, some important frontage, and gated community), whether the property has development approvals,²² the location of the parcel within the urban area and the date the parcel was sold. No sales were for Gulf coastal properties so the effect of such locations on price should not be present.

The hypothesis will be tested by subjecting 1,125 property sales within Collier County to statistical analysis. The goal of this testing is to estimate the economic value of increasing units (or density) to a given parcel of land. Increasing units to a given parcel should increase the value of the parcel. The resulting value increase would be the incremental or marginal revenue product of increased units. This product would be the value of transferred development.

²² The relevant approvals would include subdivision, Planned Unit Development (PUD) or Development of Regional Impact (DRI). These are all classified as “approved” or “subdivided” without distinction to the actual mode of approval.

A. THE TOTAL SAMPLE

It is postulated, and soon will be demonstrated, that there are few significant economic differences within the study area. The observed differences, it will be shown, are due to the different characteristics or situations of the properties, such as their approval for development, location within the urban development boundary, etc.

The model used in this multiple regression analysis is:²³

$$\text{LogPrice} = A + (b_1 * \text{LogAcres}) + (b_2 * \text{LogUnits}) + (b_3 * \text{Amenity}) + (b_4 * \text{Approved}) + (b_5 * \text{Urban})$$

The regression results for the total sample are:

REGRESSION OUTPUT - TOTAL SAMPLE

Regression Statistics

Multiple R	0.8283
R Square	0.6861
Adjusted R Square	0.6844
Standard Error	1.0523
Observations	1125

ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	2706.17	451.03	407.30	0.00
Residual	1118	1238.02	1.11		
Total	1124	3944.19			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i> ²⁴
Intercept	9.7139	0.1034	93.9339
Ln(Time) ²⁵	-0.0994	0.0314	-3.1685
Ln(Acres)	0.2650	0.0546	4.8505
Ln(Units)	0.6090	0.0588	10.3551
Amenity	2.1092	0.1497	14.0920
Approved	0.1685	0.1090	1.5463
Urban	0.4172	0.1674	2.4927

²³ Recall that the logs are natural logs.

²⁴ The fact that the t Statistics for time is negative is not important. The significance of the t Statistic is not dependent on the sign, which can be ignored.

²⁵ The role of time will not receive discussion. The base for time in this analysis is January 1, 2002. All times are expressed relative to that data. The data show that land prices have been increasing at an annual rate of 9.9% during the 1998 – 2001 period. The model is structured so that all conclusions are time adjusted to 1 Jan 2002.

The regression equation was able to explain 68%²⁶ of the variation in parcel price. All of the variables are highly significant except for Approved. This interesting result suggests that the approval or non-approval of property for development appears predictable and does not play a major role in explaining parcel price when all parcels are considered.

The regression statistics for the Total Sample shown above may be entered into the general equation to look like:

$$\text{LogPrice} = 9.9139 + (.265 * \text{LogAcres}) + (.609 * \text{LogUnits}) + (2.109 * \text{Amenity}) + (.1685 * \text{Approved}) + (.4172 * \text{Urban})$$

The regression equation was in the log form.²⁷ Converting from logs to back to a linear form, the following form results:

$$\text{Parcel Price} = M \text{ Acres}^{\alpha} \text{ Units}^{\beta}$$

To the extent that any of the dummy variables are involved, they are simple multipliers, similar to the Intercept, M. The regression equation for a parcel located in the urban area, that has some amenity and has approval for would be:

$$\text{Parcel Price} = \text{Acres}^{\alpha} \text{ Units}^{\beta} M \text{ Amenity Approved Urban}$$

Because these dummy variables are simple multipliers, they need not be discussed here.

The exponent for Acres is equal to 0.265²⁸ and the exponent for Units 0.609.²⁹ The fact that they are each less than one means that parcel price will increase with additions of either acres or units, but at a diminishing rate. The fact that the total of the two exponents is less than one means that the parcel price will grow at a diminishing rate with the expansion of both acres and units.³⁰ Mathematically:

²⁶ The Adjusted R Square of 0.6844 equated to 68%.

²⁷ Meaning that the magnitudes of the variables had been converted to natural logs before the regression model was run.

²⁸ The coefficient of Ln(Acres) in the regression equation.

²⁹ The coefficient of Ln(Units) in the regression equations.

³⁰ This is the demonstration of diminishing returns.

$$\delta \text{ Parcel Price} / \delta \text{ Acres} = \alpha \text{ M Acres}^{\alpha-1} \text{ Units}^{\beta}$$

Given that $\alpha < 1$, then $\alpha - 1 < 0$ and

$$\delta \text{ Parcel Price} / \delta \text{ Acres} < 1$$

and

$$\delta \text{ Parcel Price} / \delta \text{ Units} = \beta \text{ M Acres}^{\alpha} \text{ Units}^{\beta-1}$$

Given that $\beta < 1$, then $\beta - 1 < 0$ and

$$\delta \text{ Parcel Price} / \delta \text{ Units} < 1$$

This latter expression is the one that estimates the value of increased intensity (additional units) and thus is the basis for projecting the value of a transferred development right. Note may be taken of the fact that units add more to price (0.609) than additional acres (0.265), indicating that there are market pressures to increase intensity, at least within the common density ranges of Collier County. Before dealing with TDR values, it would be advisable to fully explore the sub-components of the Collier land market and to support the presumptions set out above.

The Collier (or study area) land market is subdivided into Retail and Bulk sales and also into Urban and Rural areas. The number and averages for these sub-areas are set out above. The standard regression model was run for each of the sub-markets. These results are set out below.

B. URBAN – RURAL³¹

The Collier Land market analyzed herein is subdivided into urban and rural areas. These areas are defined in the Collier County Comprehensive Plan and this study uses those definitions. The summary statistics for these areas are:

	Rural	Urban	Total
Total Sales	\$108,934,500	\$451,999,000	\$560,933,500
Total Parcels	826	299	1,125
Total Acres	20,756	8,119	28,875
Total Units	4,325	30,331	34,656
Average Parcel Price	\$131,882	\$1,511,702	\$498,608
Price Per Acre	\$5,248	\$55,670	\$19,426
Price Per Unit	\$25,187	\$14,902	\$16,186
Acres Per Unit	4.80	0.27	0.83

As would be expected, rural lots are much bigger than urban and command higher per unit values. Urban lots are much smaller while prices per acre are much higher. These data reflect both consumer preferences and Collier County land-use regulatory practices.

The regression results for the urban and rural split are shown below. Some very

REGRESSION OUTPUT - URBAN AREA

Regression Statistics					
Multiple R	0.7532				
R Square	0.5673				
Adjusted R Square	0.5600				
Standard Error	1.2684				
Observations	299				
ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	618.12	123.62	76.84	0.00
Residual	293	471.37	1.61		
Total	298	1089.49			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>		
Intercept	11.1063	0.4869	22.8088		
Ln(Time)	-0.0707	0.0790	-0.8949		
Ln(Acres)	0.9872	0.2480	3.9799		

³¹ As pointed out above, TDR would appear to be infeasible for Orange Tree. The reason for this infeasibility is that the value of a unit is negative, indicating that real estate sales values have hit diminishing returns at existing densities. The only way for TDR to be feasible in the Orange Tree area would be for land currently zoned for five-acres being allowed to convert to Orange Tree densities, or what would be new Orange Tree densities.

Ln(Units)	-0.1406	0.2609	-0.5390
Amenity	0.8794	0.2579	3.4093
Approved	0.9062	0.2666	3.3988

REGRESSION OUTPUT - RURAL AREA

Regression Statistics					
Multiple R	0.8596				
R Square	0.7388				
Adjusted R Square	0.7353				
Standard Error	0.6171				
Observations	381				
ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	403.922	80.784	212.167	0.000
Residual	375	142.784	0.381		
Total	380	546.707			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>		
Intercept	9.32616276	0.21027	44.35405		
Ln(Time)	-0.00031058	0.02949	-0.01053		
Ln(Acres)	0.56515833	0.13842	4.08285		
Ln(Units)	0.55704552	0.15508	3.59210		
Amenity	2.5364973	0.19889	12.75310		
Approved	0.02774902	0.15764	0.17603		

interesting differences occur. In neither sub-market is time of significance, but in the total market, time is of significance. In both markets the more important factors in explaining price are lot size and the presence of amenities. In the urban market units is insignificant while in the rural market it is highly significant. The reason for this difference is that the urban market is dominated by the retail sale of individual home-sites where the number of units is one. In the rural market there are more bulk sales and the positive contribution of units is more apparent. Thus the number of units is significant in the rural area but not in the urban.

In the total sample, a dummy variable Urban was significant (t Statistic of 2.49), meaning that parcel prices were significantly different in the Urban Area than in the Rural Area. The analysis of the Urban and Rural sub-areas confirms those differences. These differences are incorporated into the total sample model by including the Urban dummy variable.

C. BULK – RETAIL

Analysis of the bulk and retail land markets shows important differences. As would be expected, the prices realized for retail homesite sales are more individualistic, responding less to the standard characteristics and more to individual site characteristics. Thus the R^2 for retail sales drops to 29% whereas it is 60% for bulk sales. The significant factors explaining retail sales prices are lot size, the existence of amenities, and location in the urban area.³² For bulk sales, the most important factor in determining prices is whether or not the parcel has been approved for development. Both of these sets of determinants are easily understood and all are incorporated into the total sample either as explanatory or dummy variables.

REGRESSION OUTPUT - RETAIL MARKET

Regression Statistics

Multiple R	0.5401
R Square	0.2917
Adjusted R Square	0.2862
Standard Error	1.0836
Observations	655

ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	313.80	62.76	53.45	1.78346E-46
Residual	649	762.10	1.17		
Total	654	1075.90			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>
Intercept	9.3751	0.1221	76.7726
Ln(Time)	-0.0985	0.0426	-2.3093
Ln(Acres)	0.4841	0.0582	8.3141
Amenity	1.2060	0.2071	5.8244
Approved	0.7406	0.1221	6.0636
Urban	1.1606	0.1968	5.8974

³² The number of units does not appear because in every instance the number of units is 1, so there is no variation in the number of units.

REGRESSION OUTPUT - BULK SALES

Regression Statistics

Multiple R	0.7777
R Square	0.6048
Adjusted R Square	0.5997
Standard Error	1.1744
Observations	470

ANOVA

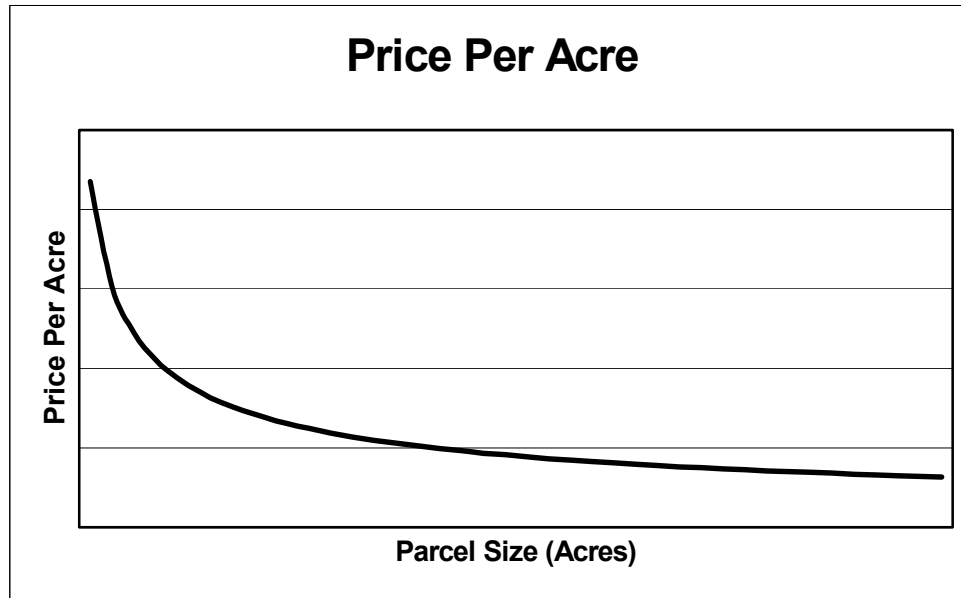
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	977.400	162.900	118.110	0.000
Residual	463	638.583	1.379		
Total	469	1615.983			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>
Intercept	10.3875	0.8361	12.4235
Ln(Time)	-0.1090	0.0558	-1.9533
Ln(Acres)	-0.0715	0.5245	-0.1363
Ln(Units)	0.9328	0.5341	1.7467
Amenity	0.5297	0.9429	0.5618
Approved	0.8424	0.2256	3.7335
Urban	-0.7057	1.5869	-0.4447

D. PRICES PER ACRE AND PER BUILDABLE UNIT

It is often noted that parcel prices per acre will decline with the number of acres in the parcel. The same is true for prices per buildable unit. Both of these tendencies were tested for in the Total Sample and were found to exist.

Price per acre declines precipitously with the number of acres, with all other variables behaving as before. The following graphic shows the rapid decline. It is always comforting when generally accepted principles of land economics are found to exist in a sample, as they do here. Like price per acre, price per buildable unit declines with the number of units in a parcel. Unlike price per acre, the rate of decline is much less. This conclusion is optimistic for TDRs in that adding additional units will tend to reduce per unit prices and, if that reduction is great, the result could be to reduce total revenue, thereby removing any profit potential from such unit additions. However, the reduction in revenues resulting from additional units will tend to be moderate, thereby providing potential profit from unit increases.



TOTAL SAMPLE PRICE PER ACRE

Regression Statistics

Multiple R	0.7714
R Square	0.5950
Adjusted R Square	0.5935
Standard Error	1.1363
Observations	1125

ANOVA

	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	531.154	411.350	0.000
Residual	1120	1.291		
Total	1124			

	<i>Coefficients</i>	<i>t Stat</i>
Intercept	9.0705	105.8784
Amenity	1.6050	9.0353
Approved	0.9766	10.1033
Urban	0.6137	3.9257
Ln(Acres)	-0.5222	-9.7524

TOTAL SAMPLE PRICE WITH UNITS

Regression Statistics

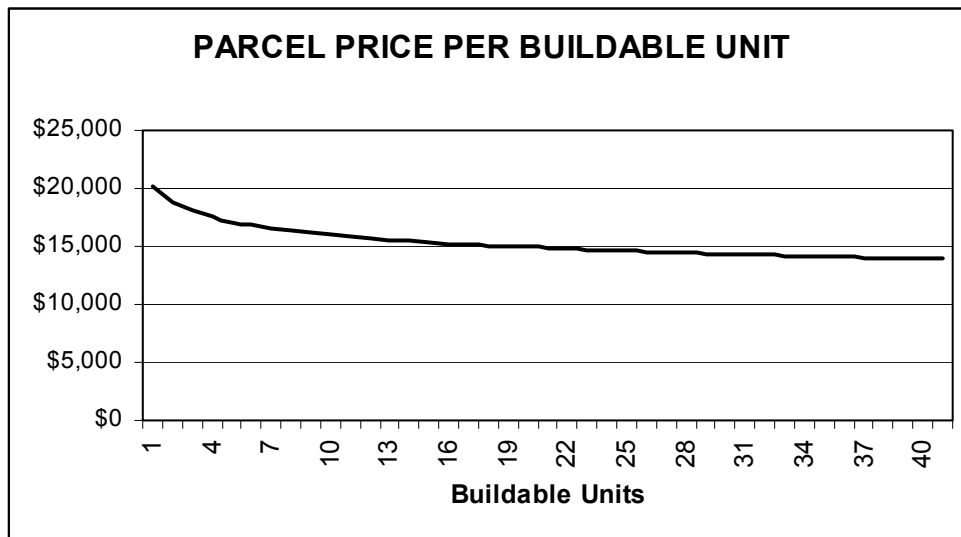
Multiple R	0.5829
R Square	0.3397
Adjusted R Square	0.3368
Standard Error	1.0628
Observations	1125

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5.00	650.45	130.09	115.16	0.00
Residual	1119.00	1264.07	1.13		
Total	1124.00	1914.52			

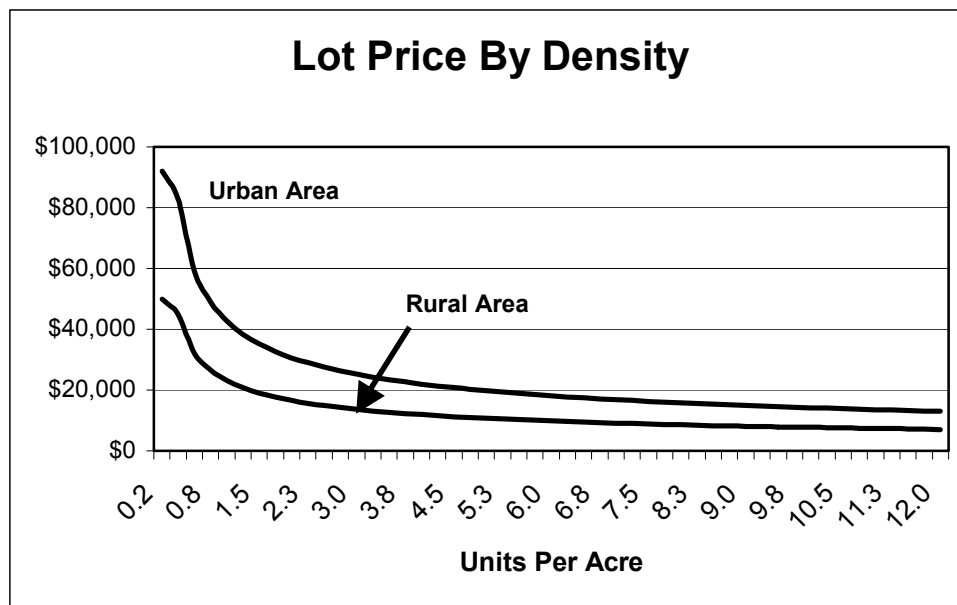
Coefficients Standard Error t Stat

Intercept	10.008	0.085	118.323
Ln(Time)	-0.066	0.031	-2.126
Ln(Units)	-0.135	0.026	-5.133
Amenity	2.428	0.136	17.887
Approved	-0.136	0.090	-1.506
Urban	-0.199	0.110	-1.813



E. DENSITY

The Collier market is a low-density market. While there is always the possibility that this observation is the result of the densities permitted by Collier County land development regulations, market values appear to be so clear, showing a sharp decline in lot price with density. These data would suggest that densities higher than 3 per acre appear to be uneconomic in the market area. Note may be taken of the fact that this analysis does not consider how amenities may alter the density-price pattern.³³ These



data suggest that the densities that would maximize value would be in the 2 per acre range. Further, these data suggest that there will be the highest value for TDRs in the lowest density zoning classifications. In the Rural Fringe Area, the proposed receiving areas are presently allowed to develop at one unit per 5 acres. The proposal is to allow development at two units per 5 acres. This is the density range that has the higher values for increased intensity of development.

³³ The reason for the odd kink in the lines for densities of less than one per acres is that the change in densities is not uniform below one per acre.

F. VALUE OF INCREASED INTENSITY

The objective here is to estimate the value of a TDR. This value will be estimated using the Total Sample Model and The Retail Model, both of which were set out above. Looking first to the Retail Model:

RETAIL MODEL COEFFICIENTS

<i>Coefficients</i>	
Intercept	9.3751
Ln(Time)	-0.0985
Ln(Acres)	0.4841
Amenity	1.2060
Approved	0.7406
Urban	1.1606

Let's begin with property located in the rural area and thus zoned for one unit per 5 acres. Further let's assume a 50-acre tract where, with TDR, lots sized can go from 1 per 5 acres to 1 per 2.5 acres. The model tells us that 5-acre lots in this tract would sell for \$25,701 without development approvals.³⁴ Taking the land through subdivision will increase values to \$53,901 for this typical 5-acre lot.³⁵ Of course, there are costs associated with obtaining subdivision³⁶ approvals that are not considered herein. The model output for this unsubdivided tract yields:

RETAIL SALES – RURAL AREA UNSUBDIVIDED LOTS			
	Value Per Lot	Total Value	Incremental Value Per Lot
5	\$25,701	\$257,010	
2.5	\$18,375	\$367,491	\$12,542

Going from a 5-acre to a 2.5-acre configuration adds additional, incremental or marginal revenue of \$12,542 per lot. Assuming away transactions costs, this would be the value of adding additional density to a defined parcel.

If this tract is taken through subdivision, the results are:

³⁴ \$5,140 per acre.

³⁵ \$10,780 per acre.

³⁶ Here the term un-subdivided is used in order to avoid the use of "unapproved," implying that an approval is required for use, which it is not.

RETAIL SALES – RURAL AREA SUBDIVIDED LOTS			
Lot Size (Acres)	Value Per Lot	Total Value	Incremental Value Per Lot
5	\$53,901	\$539,011	
2.5	\$38,536	\$770,716	\$23,170

Now the incremental value rises to \$23,170 per lot.

The Total sample Model yields somewhat different results. Employing the same hypothetical, the incremental values or going from a 5-acre to a 2.5-acre configuration in the Rural Area are:

RURAL AREA				
Lot Size (Acres)	UNSUBDIVIDED		SUBDIVIDED	
	Retail	Total Sample	Retail	Total Sample
5				
2.5	\$11,048	\$9,061	\$23,170	\$11,790

For unapproved properties the results are somewhat consistent. However, for approved, the Total Sample Model yields little change in incremental value while the Retail Model projects a doubling of the incremental value. In the Total Sample there are both retail and bulk sales. Bulk sales are expected to realize lower per unit and per acre values because of the discounting both for time and for risk that the market will impose. These values are shown below. Per acre values are not all that different while per unit values are substantially different. Because average per unit values are

	Retail	Bulk	Total
Total Sales	\$44,084,350	\$516,849,150	\$560,933,500
No. Sales	655	470	1,125
Total Acres	1,928.81	27,139.56	29,068.37
Total Units	655	34,773	35,428
Average Parcel Price	\$67,304	\$1,099,679	\$498,608
Price Per Acre	\$22,856	\$19,044	\$19,297
Price Per Unit	\$67,304	\$14,864	\$15,833

lower for bulk sales, it would follow that incremental and marginal values would also be lower. These lower values would result from the nature of the discounting rather than fundamental differences in values. Another factor could be that many of the units available by zoning are not achievable when the site is actually laid out. Simply put, the revenues to be derived from selling finished units within bulk sales parcels are relatively uncertain and will be received in the future, thus risk adjusted and present values will be lower. For the retail sale of unsubdivided lots there would be little if any differential discounting, for both types of properties appear to have current use value.

There are costs associated with transferring development from one parcel to another. These costs would include:

- The cost of acquiring development rights,
- Closing costs associated with that acquisition,³⁷ and
- Foregone interest while awaiting the sale of transferred units.

The offer price of a TDR would be the incremental revenue less these transaction costs.³⁸ Studies undertaken for the New Jersey Pinelands Commission suggested a reduction of 50% from incremental value to TDR price.³⁹ If this discount were to prevail, Collier County TDRs should achieve market values of approximately \$12,000 in the rural fringe area. More recent TDR experience has suggested lower discounts. In the case of the Long Island Central Pine Barrens, the discount from incremental value to TDR market price appears to be less than 25%.⁴⁰ Using a discount of 20%, the projected value of a TDR for use in the Rural Fringe Area is \$18,500.

A TDR that was transferable into the urban area would have values approximately the same as in the Rural Fringe Area. Employing the Retail Model and re-adjusting the 50-acre hypothetical parcel from four to five units to the acre:

RETAIL SALES – URBAN AREA, APPROVED LOTS			
Lot Size (Acres)	Value Per Lot	Total Value	Incremental Value Per Lot
.25	\$40,345	\$8,068,952	
.20	\$36,214	\$9,053,394	\$19,689

This results in an incremental value of approximately \$20,000 per right and, at 80%, a TDR value of \$16,000. Taking urban density from three to four units to the acre yields values virtually identical to those in the Rural Fringe Area.

Given the data analyzed, a TDR value approximating \$18,500 is warranted and will be utilized herein. This value considers the entire range of values discussed above.

³⁷ In some instances there are commissions to be paid since realtors actively broker TDRs where there are successful TDR programs.

³⁸ While foregone interest is not actually a transaction cost, it will be lumped together with actual transaction costs as a net deduction.

³⁹ J. Nicholas, "The Value of Pinelands Development Credits," New Jersey Pinelands Commission, 1986.

⁴⁰ J. Nicholas, "The Economic Value of Development Rights in Brookhaven, Riverhead and Southampton," a report prepared for the Central Pine Barrens Credit Clearinghouse, January 1998.

G. THE SENDING AREAS

The sending areas are:

PROPOSED TDR SENDING AREAS

Sending Area	Acreage	Units per Acre	TDRs
Rural Fringe	20,000	0.2	4,000
Area "F"	6,550	0.1	655
Total	26,550		4,655

There are a total of 26,550 acres of sending areas. These properties would be assigned 4,655 TDRs. This assignment is at one TDR for each 5-acres for property in the Primary Sending Area. The property in the Primary Sending Area at this time is the Rural Fringe Area. Secondary Sending Area properties are assigned TDRs at a ratio is one TDR per 10-acres. This lower ratio is due to the lands in Secondary Sending Areas being virtually all (99%) wetlands and thus having less development potential. The property in the Secondary Sending Area at this time is Area "F".

There are presently 4,655 development rights in the sending area. The Total Sample Model predicts a value of \$3,793 per acre, for the same 50-acre tract if this tract was in the rural area and had no approvals. If a conservation easement were used to remove development potential, the value would drop to approximately \$900 per acre. This would appear to be the agricultural value of tracts in the rural area. The model would project a value of \$230 per acre if agriculture were not viable. For purposes of this analysis, a residual value of \$750 will be employed for the properties in the Primary Sending Area. A residual value of \$230 will be used for Secondary Sending Areas, and a pre-regulation value of \$1,897 (50% of the Primary Sending Area) will be applied in those areas. These lowered figures are used to reflect the nature of the Secondary Sending Area property. If one TDR were to be allocated per development right, a total of 4,655 TDRs would be needed. At prevailing values, a total of \$71,775,757 exists as development value.

SENDING AREA VALUES			
	Primary	Secondary	Total
Acres	20,000	6,550	26,550
Prior Value	\$3,793	\$1,897	
Residual	-\$750	-\$230	
Change	\$3,043	\$1,667	
Total Change	\$60,860,000	\$10,915,575	\$71,775,575

A TDR program would transfer this development value to receiving areas. An estimated value of \$18,500 per TDR results from the model. Allocating 4,655 TDRs to sending area properties would generate \$86,117,500 in value. This provides coverage of sending area development value at 120%.

H. THE RECEIVING AREAS

There are three potential receiving areas:

Rural Fringe Area:	
Primary Receiving Area ⁴¹	29,700
Secondary Receiving Area	2,500
Total Receiving Area	32,200
TDR Bonus per Acre	0.20
Maximum Absorption	6,440
Urban Area:	
Acres	7,912
TDR Bonus per Acre	2.0
Maximum Absorption	15,824
Orange Tree: ⁴²	
Acres	1,200
TDR Bonus per Acre	2.0
Maximum Absorption	2,400
GRAND TOTAL	24,664

In other TDR areas a “Rule of Thumb” has evolved that there should be the ability to absorb at least twice the number of TDRs created.⁴³ Here there is the ability to absorb over 5 times the number of TDRs created. On the one hand, this large number of potential receiving areas adds to the feasibility of a TDR program. On the other hand, there may not be enough TDRs to meet demand, thus frustrating potential transfers while sending TDR values to levels that would be infeasible for many potential users.

It is recommended that the current proposed Rural Fringe Area TDR program be limited to receiving areas within the Rural Fringe Area. There is the potential to absorb 6,440 TDRs within this area, roughly one and one-half times the number of TDRs

⁴¹ Originally the Rural Fringe Area had 31,800 acres of receiving area. This was reduced by 2,100 when the northeast portion of North Belle Meade was changed from receiving area to sending area. The revised total was increased by 2,500 to incorporate the Neutral Area as a receiving area.

⁴² Orange Tree is not included because feasibility of TDR for Orange Tree has not been demonstrated.

⁴³ James T.B. Tripp and Daniel Dudek, “Institutional Guidelines for Designing Successful Transferable Development Rights Programs,” *Yale Journal on Regulation*, Vol 6, 1989.

created. While this ratio is less than the desired two-times, if this TDR program proves successful, other possible receiving areas will be needed, so conserving those receiving areas at this time preserves options for the future. Alternatively, other receiving areas can be added if the Rural Fringe Area proves to be insufficient. The recommendation is to allow and increase in density from 0.2 units per acre in the receiving area to 0.4 units per acre. This equates to changing permitted density from one unit per five-acres to one unit per-two and one-half acres.

V. KEYS TO A SUCCESSFUL TDR PROGRAM

There are several keys to TDR success. Following these guidelines will not guarantee success. However, a failure to follow these guidelines almost assures failure.

AUTHORITY. There is no question about Collier County's authority to enact a program. First, the County Powers Act, Chapter 25, *Florida Statutes*, authorizes counties to "prepare and enforce comprehensive plans for the development of the county."⁴⁴ Additionally, the Growth Management Act "encourages" the use of innovative land development regulations including . . . transferable development rights."⁴⁵ While further authority may not be needed, The Bert J. Harris, Jr., Private Property Rights Protection Act authorizes or recognizes TDRs as a means to deal with the economic consequences of certain land development regulations.⁴⁶

CLARITY OF PURPOSE. A TDR program must have clearly defined and attainable goals. In this way, movement toward those goals can be managed and attainment can also be measured. Collier County must resist the temptation to add other goals to its TDR program.

RESOURCES. Collier County will have to commit some fiscal and staff resources to the on-going administration of a TDR program. Experience elsewhere has shown that the fiscal and personnel costs are not extensive, experience has also shown that if staff and fiscal resources are not made available the program will dwindle away.

EVASION PROOF. The most frequent reason for failure of TDR programs is the lack of economically feasible receiving areas. The second most common reason is evasion. Developers in receiving areas are expected to purchase TDRs from sending area property owners. This analysis suggests a price of \$18,500. The result of this purchase should be that the developer could increase development within the receiving area. If the same increase can be had by other and cheaper means, TDRs will be eschewed in favor of the cheaper route. In designated receiving areas there must be no alternate way of increasing density other than TDR.

ECONOMIC FEASIBILITY. Development rights will be traded and transferred if and only if it is economically feasible for both buyers and sellers to trade. Any TDR program must begin with economic feasibility and feasibility must be retained. The

⁴⁴ Chapter 125.01(1)(g), *Florida Statutes*.

⁴⁵ Chapter 163.3202(3), *Florida Statutes*.

⁴⁶ Chapter 70.01(4)(c)(3), *Florida Statutes*.

County will have to monitor the program and, where necessary, make appropriate corrections and adjustments so that the program remains viable.

USE BY RIGHT. A defining difference between successful and unsuccessful TDR programs is whether the increased development in the receiving areas is by right. The alternative to use by right is to require some type of discretionary approval.⁴⁷ The requirement for discretionary approvals removes the certainty that is the basis for economic feasibility. Additionally, requiring discretionary approvals can put the program in legal jeopardy. In *French v New York*,⁴⁸ the court expressed a view of TDR, saying that:

[I]t is a tolerable abstraction to consider development rights apart from the solid land from which as a matter of zoning law they derive. But severed, the development rights are a double abstraction until they are actually attached to a receiving parcel, yet to be identified, acquired, and subject to the contingent future approvals of administrative agencies, events which may never happen because of the exigencies of the market and the contingencies and exigencies of administrative action.

This was preparatory to ruling against the City of New York. For economic and legal reasons, increased density by TDR must be by right in the receiving areas. If Collier County cannot make this commitment, then a TDR program may be ill advised at this time.

SIMPLICITY. Any land development regulatory program tends to become complex. TDRs are perhaps more conducive to complexity than other types of development regulations. Strong efforts should be exerted to keep a TDR program as simple as possible and any effort to add requirements should be resisted as constituting a fundamental threat to the viability of the program.

TRANSACTIONS COSTS. All efforts should be undertaken to keep transaction costs to a minimum. The greater the administrative or public “hassle” confronting a prospective buyer or seller of rights, the less economic value the rights have and the less effective the program will be. Restrictions on the use of rights by buyers or uncertainty about the ability of sellers to sell rights inhibit participation in a rights transfer program.

ESTABLISHING A MARKET. Two of the more successful TDR programs have established programs that supported TDRs by offering to purchase the rights at a stated but heavily discounted price.

⁴⁷ Use by right does not waive or alter any land development regulation other than the number of dwelling units that will be allowed. All environmental, safety and design requirements will remain in force.

⁴⁸ 350 N.E.2d 381.

The New Jersey Pinelands. The New Jersey Pinelands Commission is a state agency. As such, it has only those resources allocated to it by the state of New Jersey. When the Pinelands Plan was adopted, it was recognized that the TDR program incorporated within the plan would require extraordinary efforts before it would be viable. A total of 33,200 TDRs⁴⁹ were created, covering 840,100 acres to be preserved.⁵⁰ Additionally, there were nine counties and 52 municipalities within the area managed by the Pinelands Plan.

Burlington County, having much of its area in the Pinelands, established the Burlington County Conservation Easement and Pinelands Development Credit Exchange” that would purchase TDRs from property within Burlington County. They began with \$1 million and later saw the amount go to \$5 million.⁵¹

The State of New Jersey had an on-going “Green Acres” program where the state would purchase conservation easements on farmland to assure the retention of those lands in farming.⁵² The State authorized the use of “Green Acres” monies and created Pinelands Development Credit Bank that would buy and sell PDCs as well as guarantee loans secured by PDCs. The state purchase programs paid an average of \$3,239 for PDCs, ranging from a low of \$1,750 to a high of 5,650.⁵³ The objective of the bank was to support and not to displace the PDC program. It did this by offering minimal prices for PDCs and later auctioning off those rights. The bank made a “profit” and is returning that profit to the people of New Jersey.

Central Pine Barrens of Long Island. The plan adopted to preserve the 52,500 acres of the central Pine Barrens contained a TDR program – called Pine Barrens Credits (PBC).⁵⁴ The 52,500-preservation area is within three municipalities, Brookhaven, Riverhead and Southampton. There are three separate PBCs, one for each municipality. The Commission created the Pine Barrens Credit Clearinghouse. The Clearinghouse was given an \$8 million grant/loan from the New York General Assembly. These funds were used to offer to buy PBCs at \$12,000. Fourteen rights were sold to the Clearinghouse. When of-

⁴⁹ These TDRs and known as Pinelands Development Credits – PDC.

⁵⁰ New Jersey Pinelands Commission, “Pinelands Development Credits, Summary Report Through December 31, 1995,” (1996).

⁵¹ See Juergensmeyer, Nicholas & Leebrick, note 3, page 449 ff.

⁵² *Supra*.

⁵³ *Amicus* brief of James C. Nicholas et al., 1997 WL 9053 at *Suitum v Tahoe Regional Planning Agency*, 117 S.Ct 1659 (1997) (No. 96-243).

⁵⁴ Here known as Pine Barrens Credits – PBC.

ferred at public auction, the PBCs went for prices as high as \$37,000.⁵⁵ Now that the market price is established, the Clearinghouse is withdrawing from the market. The “profit” will be divided among those selling PBCs to the Clearinghouse in the belief that it is unfair to economically punish people for selling their PBCs early.

In both instances funds were made available to support the program by offering minimal purchase prices. Both banks offered prices that were claimed to be below the true worth of the rights. Nevertheless, many elected to take a “sure thing” and thus a floor was established. These floors added some degree of certainty to a very uncertain and unknown program. Additionally, these banks were entities that developers could approach to purchase development rights.⁵⁶ The existence of these banks added greatly to the acceptance of the TDR programs and their eventual successes. There certainly are TDR programs that are successful that had not had a bank, so a bank is not a requirement⁵⁷. But it sure is a good idea.

Successful TDR programs have the active support of the public and of public officials. This support assures that the original commitments remain respected. It also assures continuing interest in the program so that adjustments and corrections can be made as programs arise. The fundamental commitment made is that if property owners will sever and transfer their development rights, they can use those rights in economically feasible receiving areas. As long as this remains true, a TDR program should be successful.

A final point. What if TDRs are not available at economically feasible prices? This problem has not occurred in TDR programs, at least not yet. However, unavailability of TDRs has to be given as much concern as the value of TDRs to sending area property owners. If TDRs are not available at economically feasible prices, this should trigger a reconsideration of the program. Such reconsideration could include:

- Adding more sending areas,
- Making TDRs worth more than one dwelling unit,
- Selling TDRs from a bank before rights are acquired from sending area properties (TDR futures), and
- Abandonment of the program.

⁵⁵ Central Pine Barrens Planning Commission, press release, “First Ever Auction of Pine Barrens Credits Successfully Completed today,” August 26, 1999. PBCs in Brookhaven sold for \$37,000 and 10 PBCs in Riverhead sold for \$17,000.

⁵⁶ It appears that developers may prefer to purchase rights from banks.

⁵⁷ Montgomery County, Maryland, is an example of a TDR program that has been successful and does not have a bank. What Montgomery County’s TDR program does have is no way to evade the program and use of TDRs by right in the sending areas.

It would appear that transferable development rights are economically feasible for Collier County. However, a successful TDR program requires diligence as well as economic feasibility.

VI. INCENTIVE OPTIONS

A program of transferable development rights is a set of economic incentives that seek to economically reward the preservation of certain properties. As such, TDR fits in with other development incentive programs. Developers are commonly offered incentives to develop in a manner that is deemed to be more beneficial to the public than what would have been the case. Several examples are:

- Allocating additional or “bonus” residential units if some portion of the dwelling units are “affordable,”
- Allocating additional or “bonus” development, either residential or non-residential, for public open space (very commonly used in highly urbanized areas),
- “Bonuses” for the preservation of something of historic importance to the community, and
- “Bonuses” for the preservation of natural or native habitat.

These are merely examples but all have the same theme of economically rewarding developers for developing in a manner that the desired by the community. Again, TDR is one of the incentive measures available to encourage the preservation of some lower value uses of land, such as agriculture and open spaces.

The economic modeling undertaken as part of this research indicates market densities of approximately one dwelling unit per acre.⁵⁸ This conclusion is made recognizing the low-density yield possible on the proposed receiving area properties. The proposal under consideration is to allow developmental density in the receiving area to go from 0.2 units per acre to 0.4. This indicates that even with the TDR bonus there is still potential for more increased density on the receiving area. Thus further bonuses might be economically feasible.

There are two additional developmental actions of concern to Collier County as possible additions to any TDR program. There two concerns are, first, affordable housing and, second, the preservation of native vegetation.

⁵⁸ That is, if there were no limits imposed on density in the subject area, the result would be approximately one unit per acre.

A. TDRs AND AFFORDABLE HOUSING

Collier County already has an affordable housing bonus/incentive program. In the Urban Area developers can achieve increased density if affordable housing is provided. It is entirely possible to do the same thing in the Rural Fringe Area TDR receiving areas.

The existing proposal is to allow development intensity in the Rural Fringe Area to increase from one unit for each five acres to two units for each five acres. It would be possible to allow three or four units for each five acres if affordable housing were provided. The question here is not could this be done. The relevant questions are, first, would the addition of affordable housing bonuses complicate and even compete with the TDR program itself and, second, would affordable housing actually result?

1. **COMPLICATING OR COMPETING WITH TDR PROGRAM.** The problems relating to and resulting from adding to the complexity of a TDR program were discussed in the previous section. No one can predict when an additional unit of complexity will become too much complexity. Having made these points previously, all this is necessary here is to refer back to them. If any affordable housing bonus would first require that density be transferred from sending areas, competition between the incentive programs would be minimized. This would mean that before any affordable housing bonus could be achieved within a TDR receiving area, development must first be transferred. For example, if maximum intensity with TDR and affordable housing would be three units per five acres, the first unit would be by right, the second unit would have to be by TDR and the third unit would be for affordable housing.
2. **ACHIEVEMENT OF AFFORDABLE HOUSING.** The analyses undertaken herein have identified the market demand for housing in non-coastal Collier County. Market demand is for low residential density with high amenities (golf, water features, gates, etc.). This type of development is expensive, with market values far outside of “affordable” ranges. The analyses have also identified a desired density range of up to one dwelling unit per acre within the Rural Fringe Area.⁵⁹ This would indicate that there would be market pressure to add units in the Rural Fringe Area beyond the two per five acres contemplated in the draft regulations. However, attempting to sell the resulting unit at “affordable” prices would appear to be not economically feasible in the Rural Fringe Area.⁶⁰

⁵⁹ See page 25, *supra*. The one unit per acre range incorporates the nature of the receiving area property.

⁶⁰ Adding \$18,500 to the other costs of a unit would result in costs so high that only “premium” units would be feasible.

There is a possibility for integration of an affordable housing bonus with a TDR program. This possibility would be the off-site provision of the affordable housing. If the affordable housing could be provided in the urban area and the bonus density would be in the Rural Fringe Area receiving area, an affordable housing bonus could be economically feasible. Whether this mode of provision of affordable housing is consistent with community goals would have to be weighed against other competing interests. It would be necessary to workout the details, but it would appear that providing a third unit of density for each five acres for each affordable housing units would be economically feasible.

A. TDRs AND NATIVE VEGETATION

As with affordable housing, TDR bonuses could be provided for the preservation of native vegetation. This is very similar to historic preservation, where additional or bonus units are made available in return for preservation of some historic site.⁶¹ Here again the matters of complexity and competition must be fully considered.

Unlike affordable housing that can be built in many locations, native vegetation exists on certain properties and not on others. Providing a bonus for TDRs coming from sending areas that had native vegetation would encourage owners of those properties to do what is necessary to achieve any bonus provided that the costs of native vegetation preservation is economically feasible. The costs associated with native vegetation preservation are not known therefore a feasibility analysis or even a guess cannot be made. Suffice it to say that native vegetation preservation could be encouraged by TDR bonuses.

If TDRs were seen as a means to encourage native vegetation preservation on receiving sites, such bonuses would directly compete with TDRs and would make the TDR program much more complex. A way to accomplish both objectives would be to require the use of TDR on a receiving site as a precondition for receipt of a bonus for native vegetation preservation. So, for example, development could go to two units per five-acres with TDR and then three or more per five-acres with native vegetation preservation. Structuring the native vegetation incentive in this manner would enhance rather than detract from the viability of a TDR program.

⁶¹ One of the better-known TDR programs is New York City's, where TDRs are offered in return for the preservation of historic landmarks. See Juergensmeyer and Roberts, *Urban Planning and Land Development Control Law*, West, 1998.